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Nr. 12, January 1982

Magazine Printing: Wellesley Press, Framingham, Massachusetts
Game Component Printing: Reflex Offset, Garden City, Long Island
Die Cutting: Friedman Die-Cutters, New York

Arēs

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On the Cover

Star Trader as portrayed by Timothy Truman, based on a concept by Redmond A. Simonsen.

Muse

We received a letter the other day that voiced an objection we've seen in letters from other readers. This most recent letter was especially vigorous in its protest and caused me to reflect upon its assertions. The basic complaint is that the science articles in *Ares* are too conservative...too "debunking" ...too *pessimistic*. This complaint is a symptom of radical misinterpretation of the purpose and thrust of *Ares* science material. Real science is always going to be strongly at odds with science fiction. Peculiar statement? Science is inherently more rigorous than the logic-structures that support the invented "facts" of science fiction. Obviously, this is not a *fault* of science fiction, but it is a tension creating *difference* (meaning it makes things more interesting). We present our science material in a provocative manner in an attempt to do at least the following: 1.) Cause the reader to examine critically the easy assumptions of conventional SF; 2.) Provide data for reasoned speculation; 3.) Draw sharper lines between science fantasy, science fiction, and science fact (we do this not to discourage anyone from reading science fiction, but rather to increase our appreciation and understanding of these separate categories).

Some people misunderstand science fiction to be predictive or propositional. They become defensive when background elements are faulted or scrutinized. SF is *storytelling* plain and simple. It doesn't *need* to do anything else. Science is a discipline of

[continued on page 8]

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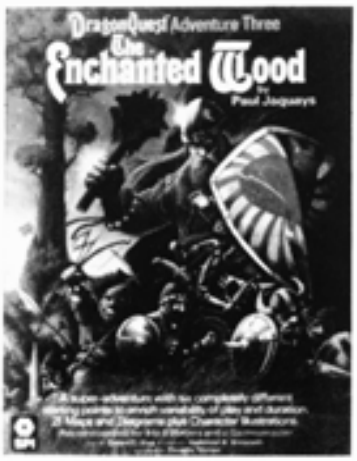

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SCIENCE FACT

New Minds
The Promises of Artificial Intelligence

by Allan Terry and Frances Grimble

Machines which can think have long been familiar to readers of science fiction. They appear in the world of literature as humanoid robots, as mechanical translators, as self-driving vehicles, and in a wide variety of other guises. *Artificial Intelligence* (often abbreviated as AI) is the branch of computer science which works at making this kind of science fiction come true. In this article we will survey the methods, goals, and achievements of AI and discuss some of the problems which currently face the creators of machine intelligence.

Artificial intelligence can be informally defined as the attempt to program computers to do the kinds of tasks "only humans can do." Some researchers attack this problem by trying to make their programs simulate human mental functioning as closely as possible. Unfortunately, very little is known about the complex mechanisms of thought. This means that these researchers must experiment to discover how people think and reason, and it means that they must borrow heavily from other fields that study the mind, such as psychology and linguistics. Other researchers construe AI to be the creation of intelligent behavior by any means possible. Though not confined to the current theories of how people function, this group also must be experimental and interdisciplinary because it must create alternatives to "familiar" ways of reasoning. For neither school of AI are the programs ends in themselves; they are the means by which theories are tested and experiments carried out. The researcher builds a program that embodies his theory, then runs it to see if it behaves in the way he predicted. A by-product of this attitude is that, unlike most computer programs, AI programs rarely become finished products. They are either discarded as completed experiments or they continuously evolve as the researcher's ideas evolve. For this reason it is best not to define AI by the results it has produced but by its approach: an experimental inquiry into the nature of intelligence.

The idea of creating artificial or machine intelligence is not new, but there was no practical way of building one until computers were developed in the mid-1940's. In 1956, Dr. John McCarthy, then a math professor at Dartmouth, organized a summer workshop for all the people (ten, mostly mathematicians and psychologists) who were interested in machine intelligence, and christened the new field "artificial intelligence," which is now the generally accepted term. At that time, computers were used almost exclusively as number crunchers or giant calculators, and the idea that they could do abstract reasoning or understand English seemed very far-fetched. These early researchers were visionary in proposing that computers could think on a human level, without knowing how to accomplish it. During the next few years some of the ideas discussed at the Dartmouth Conference were turned into AI's first working programs, and by the late 1960's the field was accepted as a legitimate research area. Today there are perhaps two thousand people working on the creation of artificial intelligence. Most AI research is carried out at universities (the most prominent being Stanford, Carnegie-Mellon, MIT, Yale, and Rutgers) although an increasing amount is done at industrial research facilities. There are also healthy AI groups outside the US, particularly in Canada, Japan and England.

The Earliest Experiments

When confronted with the term "artificial intelligence," most people seem to think of robots. Perhaps it is easier to imagine intelligence in a human-like entity than in a less familiar form. The first big surge of robotics research was in the 1960's and early 70's. There is less work going on at present, although there are indications that it is about to resume. Work slackened because robotics had developed to the limits of then-current technology. The first set of ideas was tested and deeper problems were discovered — problems that are subject to vigorous research today. To see what some of these problems are, consider what a robot would have to consist of. A robot in the science fiction sense is a machine that is mobile and anthropomorphic. This machine would require a large set of interacting programs ("mind," "reflexes," etc.) connected to some hardware (body and senses). Even in an unintelligent robot — a mechanical animal — these programs must be consciously designed to do everything we do unconsciously. Just imagine the muscular coordination, nervous control, and mental computation required to turn this page. In addition to this programming problem is the engineering task of building a suitable body and the further programming problem of including planning, thinking, language — all the other activities people might require of a robot. As one might imagine, the early robots were modest affairs. At the expense of enormous time and computation, they were able to move, slowly, through uncrowded rooms and do simple tasks such as finding and stacking boxes. More ambitious performance required more work on the program pieces. This is not to say little was accomplished. Although current robots are not comparable to the robots of science fiction, much of this technology has found its way into such efforts as the Mars lander and semi-intelligent industrial robots.

One of the early efforts in robotics was the development of computer-controlled hands and arms. The problem is how to construct and control an arm that has a freedom of movement similar to human arms. The first arms, built in the 60's, tended to shake in a rather palsied manner and stopped every few seconds to compute further trajectories. It now seems that the basic hardware is adequate and it is routinely possible to move from point A to point B without knocking over everything in between. Current work is on refinements to the basic arm, such as a sense of touch. By using pressure sensors in the fingers and force sensors in the joints, modern arms can pick up a cream puff, without destroying it, as easily as they can lift heavy weights. An even more human-like feature is the notion of compliance. A compliant arm does not force a peg into a hole if it does not immediately fit; it rotates its hand until the peg can go straight in. Computer controlled arms are being increasingly used in industry for tasks like spot welding on assembly lines. These arms use little intelligence since they only perform a fixed set of movements as dictated by the program. Still, they are more useful than specialized, mechanical devices; their human-like construction means they can use ordinary tools and movements, and changing what they do is simply a matter of reprogramming rather than rebuilding.

However useful these arms are in industrial applications, they are of limited use to a human-like robot unless coupled to a sense of sight. Vision is the primary sense for people; we think in visual terms and much of our coordination relies on visual feedback. Unfortunately, this is an extremely difficult problem for computers. We do not have a very clear idea of how human vision works; all we know is that the brain does an immense amount of complex processing. Current vision programs echo this observation. Vision seems to consist of a series of transformations of what the neurons of the retina sense, each level a more abstract description of the last. In computer programs these levels might range from dots on a TV "retina," to description in terms of edges, to small coherent regions. From regions one can build up specific objects, and finally a scene with many objects, some occluded by others, shadow, depth, and color. It is a difficult problem because there is no fixed way to do these transformations and because one wants the program to understand the scene rather than to merely describe it. Visual understanding is an example of the way people unconsciously use their common sense and their knowledge about the world; a lot of intelligence is required to judge what interpre-

tations are reasonable or to use what one expects to see as a guide to picking objects out of a poor image.

Vision is not as well developed as current computer arms, but the state of the art is fairly good for simple black and white static scenes. Computers can easily see objects like blocks on a table (shedding much light on the nature of certain optical illusions in the process), but have a harder time on real-world images like those that can be seen through most windows. A recent development is depth perception using laser range finders and stereo vision. Programs that can visually understand moving scenes in something like real-time exist, but they are definitely the outer fringe of vision research. A good illustration of this work is the "automatic automobile" being developed in Japan. This car has no driver, just a computer in the back seat connected to the car's controls and to a pair of TV cameras on the hood. Obviously, this car must detect and recognize obstacles in a very short time. Currently, this car can navigate a simple route, with fixed obstacles, at speeds up to 25 MPH without collisions. Not very impressive yet, but in twenty years we may be seriously debating the merits of computerized driving.

Learning Speech

Another important ability for humanoid robots is speech. This is really two problems: generating something to say and then saying it. The first problem is the task of understanding "natural" (human) language. The production of speech itself is more an acoustic problem than AI. Several companies now sell devices that translate text into sound waves understandable as English. These machines can produce speech with a passable inflection, but have no sense of diction or emotional emphasis (both interesting as AI problems themselves). It seems that the only limitation to the size of vocabulary and the quality of reproduction is the purchaser's bank balance. Computers can say anything you want, but cannot yet decide for themselves what to say.

It seems inconsistent to endow a general-purpose robot with speech but not hearing. Computer ears would allow people to talk to a machine instead of typing into it. Although the specific knowledge involved is different, hearing is similar to vision. There is a low level problem of turning the waveform a microphone picks up into some more tractable form. After the possible sounds (phonemes) have been identified, the computer must use its knowledge of speech and grammar to identify words, phrases and sentences. One of the better speech understanding programs, HEARSAY-II[1], can understand speech (80 times slower than real-time) from a 1,000 word vocabulary provided a very large computer is available to do the computation, and providing the speaker's accent and mannerisms have been identified through a couple of training sentences.

Actually, one of the central problems for robotics, and for AI in general, is to understand human language. Most people feel language is what distinguishes man from other animals; so langauge must be a very important key to intelligence. This importance has long been recognized, as research into language is one of the oldest areas of AI.

The first attempt to make computers understand language was the mechanical translation projects of the late 50's. It was thought that an acceptable, although incomplete, translation of one langauge to another could be accomplished by automating a dictionary. These word-by-word translators knew grammar only to the point of providing the correct endings and gross word order (for example, Spanish adjectives follow the noun rather than precede it as in English). But words that are the "same" in different languages are rarely completely equivalent, so a lot of effort was put into projects whose results can be summed up with one example. Idioms cannot be translated except as units, so when one program read in the phrase "Out of sight, out of mind," its Russian translation was "Blind idiot."

The next step was to look at units larger than individual words. The late 60's brought an interest in grammar as a basis of translation. The idea is that language is some sort of encoding, expressed as grammar and syntax, for what people think or want to communicate. This generation of programs attempted to work essentially sentence-by-sentence. Dictionary lookup is still used, but only as a small part of a larger, more intelligent system. Using sentences rather than individual words as a basis gives vastly better results than the early mechanical translation programs but is still inadequate. The problem is that people seem to work with even larger units of understanding.

Current work on language understanding concentrates on just this issue. For people, communication is more than word manipulation; understanding language involves understanding the world in all its complexity. People constantly fill in what is not verbalized, and they have active expectations as to what will be said. Language cannot be separated from culture, from emotional state, or from memory. So, language programs must have some idea of what is being talked about, they need a notion of how to order what is said so the listener will understand, and they need a much larger context than the isolated sentence.

As one example of how knowledge can be supplied to a program to make it behave more intelligently, consider the following trivial story:

John and Mary arrived at the restaurant at 7:00. John ordered rack of lamb and his wife had quiche Lorraine. John handed the waiter his American Express card and signed the bill, and then they went on to a concert.

This may seem obvious enough, but computers are very literal-minded and know only what they have been told explicitly. In order to understand the story, the program must know that restaurants are places where food can be obtained, that (unlike a market) this food is generally eaten on the spot, etc. People have a fairly consistent notion of what a restaurant is and what happens inside one. One technique used to help the computer fill in missing detail is the use of descriptions of common places and activities called "scripts"[2]. Assume the program now has the following script:

Basic Restaurant Script

Roles: D = diner
W = waiter/waitress
Props: tables, chairs, menu...
Entry Conditions: D is hungry, D has money
Results: D has less money, D is not hungry
Scenes: D enters restaurant, finds a table, and sits in a chair next to the table
W brings D a menu
D chooses food from menu and tells W his selection
W brings selected food to D
D eats food
W brings bill
D gives W money to pay bill
D leaves

When the program recognizes that this script is relevant, it can understand much more of the story. For example, John must have used his credit card to satisfy "D gives money to W to pay bill." Scripts do not explain everything; this script assumes the program already knows what food is and why people need to eat it. Nor does it explain how "Mary" and "his wife" can be identified as the same person. But scripts do allow the machine to fill in missing actions and some of the motivations. The descriptions of expected roles and acts also serves as a simple form of common sense. Imagine the story had been, "John was hungry so he went into the restaurant. When the waiter approached him, he ate the waiter." This is not the waiter's role, nor is it the expected action at that point of the script. This violated expectation can alert the program to pay more attention to the rest of the story to see if other details can explain what is going on. If John later turns out to be an alien, perhaps he is behaving according to an alien restaurant script (much to the surprise of the waiter).

Processing Information

It is now time to step back to see what we really have been talking about. We have gone from physical problems like arm coordination to the real issue: intelligence. What we are discussing are points on a spectrum of information processing ability. A bacterium processes little information to do what it does; it senses little and it has a limited repertoire of actions. We say that it is not very intelligent. We can also discuss machines in the same way. We might not want to say that a thermostat thinks, but even if we did, it does so little information processing that we could not call it intelligent. Sheer bulk of computation alone, however, does not guarantee intelligence. At the top of this spectrum (currently, at least) is man. People do not process information as fast as modern computers, but they do use information in much more complex and varied ways than any machine currently can. People are much more clever in how they use the information they have. This is the task for artificial intelligence: to build such cleverness and adaptability into computers.

There are many research areas in AI besides robotics-related work. Game programs have been widely publicized, chess being the most well-known of all. However, chess programs are not the most intelligent of game programs. Typical chess programs work by searching a "game tree" consisting of

possible moves and countermoves. "If I moved my queen up three squares, he would probably counter by threatening with that pawn, so then I could move my knight..." This method is theoretically perfect, but only if the consequences of each move can be worked out to the end of the game. In practice, the computer can search only a few moves ahead because the number of possibilities grows exponentially the further ahead it looks. People overcome the inability to look far enough ahead by using strategy derived from their knowledge and experience of chess. "I'll keep him so busy with my queen he won't see my pawn advance on the other side." AI researchers have not yet figured out how to include this kind of strategy in programs. The best chess program now plays at expert level, a rating higher than that of most players but below master and grandmaster. Chess programs have been improved not by adding more intelligence but by using faster computers which allow them to look a move or two further ahead.

Several games are played by computer more intelligently than chess, including backgammon, go (although go programs do not perform very well yet), and checkers. Arthur Samuels checkers program[3] can beat all but the top half-dozen players in the world. Checkers is, of course, a less complex game than chess, but what is notable is that Samuel's program is able to improve its play with experience. A chess program decides what move to make by evaluating each sequence of moves it examines. The evaluation function gives points for moves that dominate the board, subtracts points if the move results in the loss of a piece, etc. The choice of which factors to include in the evaluation is the main chess knowledge these programs have. The checkers program also works by looking ahead and picking what the evaluation function says is the best move. The difference is that Samuel gave his program a list of many more factors than it uses at any given time. When the program wins, it augments the weight of its current set of factors; when it loses, it tries a new factor from the list. After playing and learning from hundreds of games, it has become an excellent player.

At the present, some person must program a computer before it can do anything. Programming involves specifying desired behavior in excruciating detail, keeping track of innumerable minutiae, and requires the programmer to think of the possible outcomes of each decision. People can do this, but it is a burden. It would be much easier to simply tell the computer what we want done and let it work out how to do it. This is the idea of automatic programming. While current automatic programming systems can construct small programs (sorting simple lists and the like), the interesting issue is what will happen when computers really can program themselves. Computers will not become everyday, household tools until the average person can describe a task, in English, and have a computer solve it by programming itself. Even beyond the enormous impact that would have, consider a computer that could modify its own programming. Its capabilities, its knowledge, its "personality" are all determined by the programs that it can execute. If a computer can change these programs according to its experience, it must be considered intelligent. This machine would be a learning, maturing, introspective entity. It would be able to define its own goals and its behavior would not be entirely predictable as we would expect of a "mere machine." In short, that computer would become an individual in most of the important ways that people are individuals.

Much of AI is concerned with more psychological pursuits. By investigating how to make a computer learn in the human sense or do any of a number of "human" activities, we learn much about ourselves. There is a fairly well-known program called PARRY[4] that is a simulation of a paranoid personality. Amusing as it is to converse with a program that claims the Mafia is out to get it, the real point is that PARRY is a precise embodiment of a theory. By making minor changes to internal parameters and interacting with the program, researchers can evaluate how important these parameters are. For example, one could make small changes in the way mistrust is modelled and then observe how that changes the program's behavior. Dealing with all the tiny details required to write the program forces researchers to be very concrete about what they mean.

The Expert vs. the Machine

"Expert systems" research is the most active and exciting area of AI, because it currently has the greatest immediate and practical impact on society, an impact that will rapidly increase in the near future. An expert system is an AI program that attempts to solve a significant problem in some small scientific or medical domain by the use of human-like reasoning, or "creativity." The knowledge, the heuristics, and the "common sense" built into these programs is drawn from recognized experts in the relevant field. The task of the builder of such systems (often referred to as a "knowledge engineer") is to capture the human expert's knowledge and his methods of using it and translate this into a computer program. These programs function as intelligent assistants to scientists and doctors. Programs of this type now being used include PUFF, a lung disease diagnosis program[5]; CONGEN, which aids organic chemists in identifying unknown substances[6]; and PROSPECTOR, a geology consultant used for analyzing mineral ore deposits[7].

One of the oldest expert systems is MYCIN[8]. MYCIN is an expert at diagnosing bacterial infections of the blood. It interacts with the user to obtain a patient's history and the results of current lab work such as culture or white blood cell counts. The program then deduces what bacteria are causing the illness and prescribes antibiotics to treat them. Like its human counterparts, MYCIN possesses a store of facts — for example, it can recognize bacteria and it knows the properties of various drugs — and it also understands how to use this information. A doctor also uses a great deal of less formal knowledge: examination strategies, experience, and medical "common sense." This procedural and judgmental expertise is encoded in MYCIN as "if-then" rules, small chunks of knowledge in the form "If condition X is true, then conclude Y." An English version of one of MYCIN's rules is:

If 1) The site of the culture is blood, and
2) The portal of entry is gastrointestinal, and
3) The patient is a compromised host
Then Bacteroides is probably an organism for which therapy should cover.

Unlike non-AI programs that specify exactly what to do in great detail, MYCIN uses these rules as advice. Whenever the if-part of some rule becomes true, its then-part adds a bit of knowledge to the growing hypothesis and possibly causes (along with input data) other rules to fire. A collection of about 450 rules encodes the diagnostic expertise of this very small area of medicine. Since the program asks for any information it cannot deduce, the order in which the rules are used causes it to take the patient's history and to ask for lab work when necessary. Once the rules narrow the diagnosis to a small set of likely organisms, the program prescribes antibiotics to treat them. What is interesting about this program is not so much what it does but how it does it. It is intended to be an aid to the clinicians rather than their replacement, so it is designed to be as comprehensible and as easy to use as possible. All interaction is in the doctor's jargon subset of English. Instead of just announcing a conclusion, the program follows a line of reasoning very similar to that the doctor might have followed. The program can explain why it is asking for any given datum and how it arrived at any conclusion. In this way, the doctor can judge for himself how far to trust the program and its recommendations.

MYCIN is also an archetype for many of the social issues facing AI, the realm where "Should it be done?" is more important than "Can it be done?" MYCIN should be a very successful program, and indeed it is. The program's performance has been compared to that of human experts and the consensus is that the program performed very well. But MYCIN is not being used at any hospital nor are there any immediate plans to do so. While this is partially due to technical and funding considerations, an important issue is ethics. If MYCIN comes into general use in hospitals, and somebody dies after receiving its recommended course of treatment, who is responsible? For that matter, if MYCIN or any other diagnosis program can be shown to be as good or better than humans, is it malpractice not to use it? Our society is not legally or ethically ready to remove the human from the process. It will be a long time before we have science fiction's automatic doctors.

The Limitless Future

Since artificial intelligence is a new field, it has not yet substantially affected the general public. However, the public is now indirectly affected by a strong military interest in AI. A large share of funding for basic AI research comes from the Defense Advanced Research Projects Agency (NSF, NIH, and other civilian federal agencies supply most of the rest). As far as we know, no AI-based military system or weapon has been completed yet, but AI has great potential for military use. AI can be less effectively applied to the development of actual weapons (the current

generation of "smart" weapons owes much more to electronics than to AI) than to sophisticated information-processing. AI will probably be used for intelligence in the military sense; for instance, a vision program is now being developed to scan satellite photographs for enemy ships.

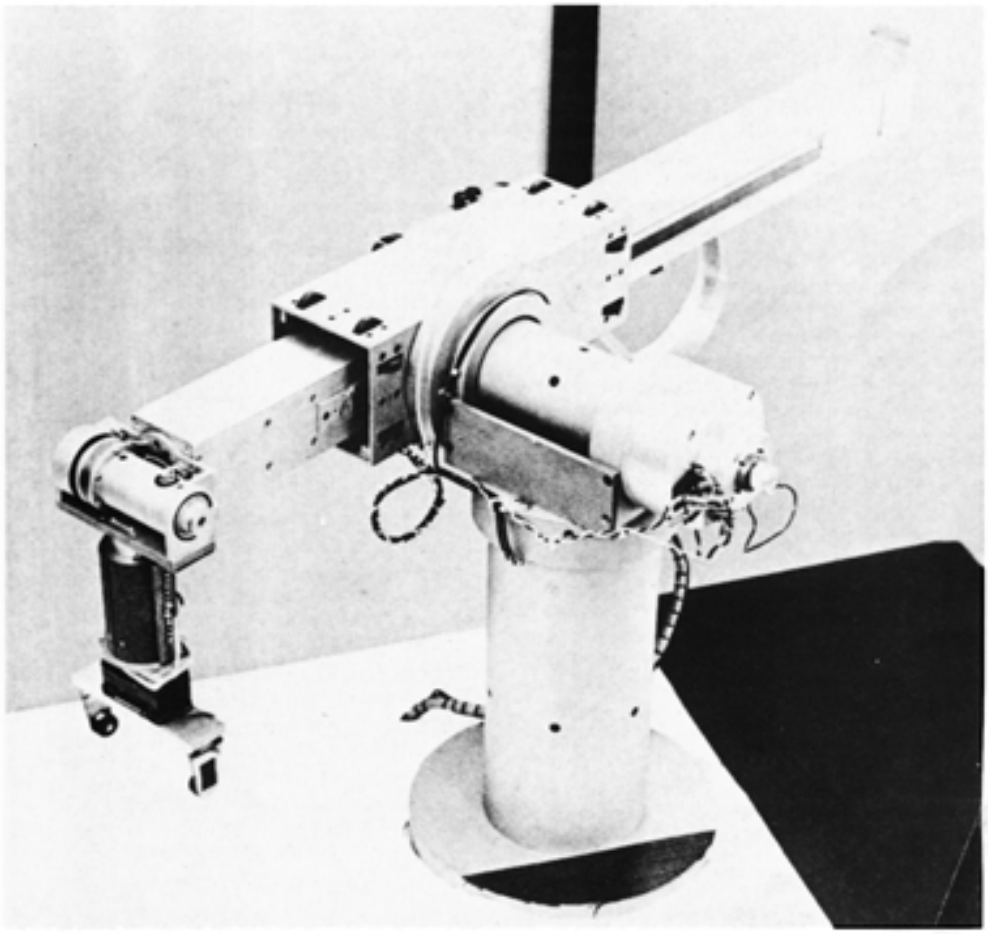
AI may have a more benign effect on society by helping to revolutionize manufacturing. There is already a trend towards augmenting the assembly line with computer-controlled tools. In the past, machines which made any given object had to be specialized. They could work faster and longer than a human at the same job, but a human is much more flexible. Computer-run milling machines can currently perform any sequence of the dozen or so actions they are capable of, but only if provided with carefully positioned tools and workpieces, and a program tape specifying the sequence of movements. Producing a different object is simply a matter of using a different tape, but these tapes are hard to make. The next step is to build an industrial robot endowed with vision, arms, and some intelligence. This robot would be much more versatile, not only because it could find and position tools and materials for itself, but because it would be easier to program. If such a robot could produce finished objects from a set of blueprints or even a detailed verbal description, the effect could be revolutionary. Mass production implies just that. Currently most items are mass-produced because custom production is so expensive. Industrial robotics has the potential for combining the economics of modern industrialization with the aesthetics of customization and hand-craftsmanship.

Perhaps the most basic impact of AI will be its contribution to the democratization of society. In the long run, success in natural language and automatic programming research would mean everybody could use computers. Computer use would not involve using a special language, going through trained intermediaries, or dealing with all the annoying details programming currently requires. This is important because it would mean common access to a fundamentally new kind of tool: a brain augmentor rather than a muscle augmentor. In the shorter run, the techniques being developed by expert system researchers could lead to a slightly different form of democratization. We are all dependent on experts, people who have specialized training. Yet these experts spend much of their time on simple, routine problems. How often do people spend time and money to see a doctor just to be told their ailment is minor and will go away by itself? A program could do elementary health maintenance and routine diagnosis, advise us when we should see a doctor and what to do if it is not necessary. Assuming the appropriate professional organizations allow it, programs for basic medicine, common legal advice, and even auto mechanics could restore to the individual much of the power now held by experts.

To Be Truly Human

Throughout this article, we have predicted some of the short-term results of current AI research. But the ultimate result of this research, if it continues successfully (and we know of no reason why it will not), will be the creation of an intelligence of human magnitude. This statement makes it necessary to define what we mean by intelligence. It often seems that intelligence is defined as anything people can do that machines currently can not do, an attitude which requires constant retrenchment as machines increase in ability. It might be more practical to ask what machines can do. Much of current AI research is aimed at giving novel abilities to machines, but most people do not call arm movement, vision, and the like "intelligence," even though these actions require much unconscious use of intelligence. Intelligence is a word ordinarily reserved for the higher forms of information processing such as learning, problem solving, and creativity. A machine that can provide the right answers to questions is not necessarily very intelligent. At the top end of the information processing continuum, it is important that the answers come for the right reasons, that there is some understanding which separates the AI program from the preprogrammed answer. Machine intelligence must be measured by the same criteria as human intelligence. If a machine can process information as flexibly and as accurately as a person, we can then say that it has a human level of intelligence.

However, a machine which possesses a human level of intelligence will not necessarily possess a human type of intelligence. We have already stated that there are two broad approaches to the creation of an intelligent computer: the simulation of human thought processes (psychological modelling) and the ad hoc method (creation of intelligent behavior by any means possible). The psychological modelers have set themselves a problem which is doubly difficult. Not only are they trying to create intelligence, they are restricting themselves to one particular model of it, which cannot be achieved until they understand precisely how human beings work. While their research will produce many valuable insights into human psychology, and methods of producing intelligent behavior useful to the ad hoc researchers, we believe that they will probably only achieve increasingly better simulations of human behavior. A completely human intelligence requires both a human brain and a human body. An intelligent computer would have a different body, senses, and internal workings; computer hardware functions in a completely different manner from the neurons of the human brain. Even if the human body and brain could be exactly duplicated, there would be no real point in creating a machine intelligence which is subject to all a human being's fallibilities and limitations. The abilities of the human body and brain could be extended in almost any direction you care to think of; for example, a machine intelligence could think hundreds of times faster, see all of the electromagnetic spectrum, and live much longer. But the way human beings think is governed by their fallibili-



A typical robotic arm (photo courtesy Stanford Artificial Intelligence Laboratory, Stanford University)

ties and limitations; an intelligence lacking these would be qualitatively different. In short, we believe it is both impossible and unnecessary to exactly duplicate human intelligence. While a machine intelligence might have some human characteristics, it seems most likely that it will not be truly human.

We believe that eventually it will be possible to endow computers with a human level, if not a human type, of intelligence. At present, AI research is focused in the individual components of intelligence, such as language understanding, rather than on building a generalized intelligence comparable to the human mind. If and when it becomes possible to create such an intelligence, it will be extremely useful to endow it with human abilities. Some of these are the ability to learn from its environment, observe the success or failures of its actions, and change its behavior accordingly – which Samuel's checkers program does in a very primitive way. Another is the ability to create some of its own goals instead of relying entirely on those provided by human programmers. Automatic programming is one example of how this is useful; when we allow the computer to work out the details of how to solve a task rather than dictating them in a program, the computer is creating some of its own goals. With more intelligence its goals will become more general – for instance, when it decides for itself what task to work on. Since automatic programming enables a computer to change its own program (including its goals), certain safeguards could be built into the machine in such a way that it could not change them. These safeguards would be imperatives, such as "Do not cause harm to humans" comparable in function to the instincts possessed by living organisms. A computer possessing all these abilities would be a changing and maturing entity. Its initial programming and knowledge would be entirely set by humans, but it would add to and modify this until it became an individual, capable of independent and self-directed thought.

The debate between those who believe that intelligent machines can be created and those who do not is largely a debate on whether or not there is something unique, undefinable, and unreproducible about human cognition – the soul, if you will. The same sort of mysterious and unique quality was attributed to organic chemistry until urea was synthesized in the nineteenth century, and then to the mechanism of cellular reproduction until the function of DNA was worked out during the last few decades. Instead of assuming cognition is an unknowable property of human life, it seems more useful to assume it is simply highly sophisticated information processing, and to attempt to understand and eventually duplicate it. While giving due respect to its enormous complexity, we feel cognition will remain mysterious only until it is better understood. AI has already produced many interesting and useful results; given enough time and effort it seems likely that we can create a general artificial intelligence. However, we admit that this prediction is ultimately based on an act of faith; it is impossible to know whether an artificial intelligence can be created or not until one is created, or until we learn enough about intelligence to scientifically prove that it is impossible.

It is unlikely that AI researchers will succeed in creating a machine possessing a human – or greater – level of intelligence within our lifetimes. But they have already endowed machines with powers which twenty-five years ago they possessed only in science fiction. The quality of machine intelligence and the uses to which it will be applied can only increase. Even if we never succeed in creating a human-level intelligence, we can expect AI in its other forms to have a substantial impact on our society.

Footnotes

1. HEARSAY-II was completed in 1976 by Dr. Raj Reddy and associates at Carnegie-Mellon University.

L.D. Erman, F. Hayes-Roth, V.R. Lesser, and D.R. Reddy, "The HEARSAY-II Speech-Understanding System: Integrating Knowledge to Resolve Uncertainty," *ACM Computing Surveys*, Vol. 12, No. 2 (June 1980), pp213-254.

2. This theory was developed by Dr. Roger Schank and associates at Yale University.

R. Schank and R.P. Abelson, *Scripts, Plans, Goals, and Understanding*, Lawrence Erlbaum Assoc., Hillsdale, N.J., 1977.

3. This program was developed by Dr. Arthur Samuel at IBM between 1958 and 1967.

A.L. Samuel, "Some Studies in Machine Learning using the Game of Checkers II - Recent Progress," *IBM Journal of Research and Development*, Vol. 11, No. 6 (Nov. 1967), pp601-617.

4. PARRY was developed by Dr. Kenneth Colby at Stanford University.

K.M. Colby, S. Weber, and F.D. Hilf, "Artificial Paranoia," *Artificial Intelligence*, Vol. 2, 1971, pp1-26.

5. PUFF was developed by Mr. John Kunz and associates at Stanford University and Pacific Medical Center.

J.C. Kunz et al, "A Physiological Rule-Based System for Interpreting Pulmonary Function Test Results," Technical Memo HPP-78-19, Computer Science Dept., Stanford University, 1978.

6. CONGEN was developed at Stanford University and the University of Edinburgh by Dr. Raymond Carhart.

R.E. Carhart, "CONGEN: An Expert System Aiding the Structural Chemist," in D. Michie (ed.) *Expert Systems in the Micro Electronics Age*, Edinburgh University Press, Edinburgh, 1979.

7. PROSPECTOR was developed by Dr. Peter Hart and associates at Stanford Research Institute.

P.E. Hart et al, "PROSPECTOR – A Computer-Based Consultation System for Mineral Exploration," *Mathematical Geology*, Vol. 10, No. 5 (1978), pp589-610.

8. The MYCIN program was completed by Dr. Edward Shortliffe at Stanford University in 1976.

E.H. Shortliffe, *Computer-Based Medical Consultations: MYCIN*, American-Elsevier, NY, 1976.

For further reading:

Margaret Boden, *Artificial Intelligence and Natural Man*, Basic Books, NY, 1977

Bertram Raphael, *The Thinking Computer*, W.H. Freeman & Co., San Francisco, 1976 ■■

MUSE *(continued from page 2)*

theory and fact. Its wonders and excitement flow both from its possibilities and its *impossibilities*. To demand that science be presented only from the man-conquers-the-universe viewpoint and label that "optimism" is to abuse the vocabulary of hope. The don't-bother-me-with-the-facts attitude is a peculiarly anti-science, anti-technological stance for a science fiction reader to adopt. To mistake serious consideration of the possible for an exercise in pessimism is to open oneself to a charge of petulance. It also suggests that there is only a science fictional literature of positivism – clearly not the case these days.

There are many "pop-sci" or "golly, technology" magazines on the stands. From them, one can get endless numbers of super-duper predictions or scare-stories loosely based on present day science. *Ares* doesn't want to give you more of that gee-whiz, empty-headed bull. As best as we can, we'll continue to provide science fact as a *contrast* to fiction, not as its pimp. We have no intention, however, of holding ourselves up as a Final Authority. But to surrender the pleasure of being a technological gadfly is asking too much. You'll notice, by the way, that we have no problem with publishing games and stories that fly in the face of scientific theory and fact. We just focus on the fun of the fiction and the suspension of disbelief.

– *Redmond*

VARIANT

Adventures in Albion
Role-Playing in the Land of Faerie

by David J. Ritchie

Practically my first thought upon finishing *Albion* for *Ares* 11 was: "I want to do more with this world." Of course, that's not a unique idea. Most designers these days tend to think in terms of systemic multiverses ("...and then there's the minigame version, and, after that, a computer game...and then we can do a source book..."). The fact is the tendency probably started when God spent much of the Seventh Day daydreaming about what other nifty things *he* could do with *his* universe. Be that as it may, one of the concepts which most naturally presented itself was to find a way to marry the world of *Albion* with the *DragonQuest* system.

The crucial problem in consumating such a marriage is that the *Albion* game contains many elements analogous to *DragonQuest,* but few real equivalencies. Thus, *Albion*'s Elves and Humans are equivalent to *DragonQuest*'s Elves and Humans, but Trolls and Gnomes in the boardgame bear little resemblance to the beings of that name in *DragonQuest*. Therefore, the main focus of this article will be upon the conversion of the numbers and terminology applying to the Persons, Magic Items, Enchantments and Places of Power in *Albion* into numbers and terms understandable to *DragonQuest* players.

The *Characteristics Summary for Dwellers in Albion* lists each of the Persons represented in *Albion,* followed by their *DragonQuest* characteristics (PS, MD, AG, EN, MA, WP, FT, PC, and PB), Aspect, Type (Race or type of entity), Magical College (if any), Spells, Rituals and Magic Talents known (if any), Skills known and the number of Weapons the Person is likely to have Rank in. The average Rank for each Spell, Talent, Ritual, Skill or Weapon is listed after each ranked ability. The Skills Table lists the likelihood of a Person knowing a particular Skill (based on Race) and what his Rank with that Skill is likely to be. The Weapons Table lists the type of Weapons typically found in *Albion,* who will know how to use them and at what Rank in the same manner as the Skills Table. Using these three items together, it should be possible to convert *Albion* Persons into *DragonQuest* NPC's of approximately the same strength.

When using the Summary and the two Tables provided, *Albion* Gnomes are considered to be equal to *DragonQuest* Dwarves in all ways except that the traditional Dwarvish antipathy toward Elves is ignored for all such Persons resident in Albion. *Albion* Trolls are, in actuality, Stone Giants (though Trolls or Fomorians are the terms usually applied by the Elves to refer to them). Wherever Giants are referred to in these rules, Stone Giants are meant. The Cait Sith is a Demonic President for purposes of conjuration, and the ritual necessary to bringing it onto this plane involves the sacrifice by torture of a progression of House Cats until the Cait Sith appears. The Cait Sith's specific Skills, Spells and Ranks will have to be determined by the GM whenever it is used in a *DragonQuest* campaign. The Worm is identical to a Green Dragon in all ways except that it has no wings and all references to wings or flying should be ignored. Callach's Waff is a Wight, retaining all the Skills and Weapon Ranks assigned to Callach, but without Callach's magical abilities. The Ancients are simply long-lived Elves.

All Enchanted Hexes and Wild Magic Hexes on the *Albion* map are treated as High Mana areas and all Mundane Hexes are treated as Low Mana areas for purposes of *DragonQuest* adventures in Albion. Terrain types are equivalent except as follows: Clear hexes should be treated as Fields for purposes of Encounters; Faerie roads will constantly change location and direction when non-Elves attempt to use them; Plains and Wastes do not exist in Albion; Caer Brandingle, Caer Oonagh, The Driffeld Knowe and Forador are all treated as Ruins; Wigan's Pen is treated as a Crypt; The Mousa Stour, all Faerie Knowes and Gnomish Delvings are treated as Caverns (unless fully occupied by their residents at the time a party enters them); Cuillan Braes, Derg Donnegal, Derwent's Watch, Fir Chlis, Fir Darrig, Gil's Rest, Kelpie Braes, Povis Heath, Ravenglass, Rona's Bath, Denby Plinth, The Giant's Dance and the Seat of Moray are all considered Places of Power for purposes of the *DragonQuest* rules and the appropriate benefits for Adepts of the College of Earth Magics apply to them; Fir Chlis, Fir Darrig, Povis Heath and The Giant's Dance are all places where blood sacrifice has been habitually performed so that only Druidic Earth Magicians can benefit from occupying them; Dermot's Dyke is treated as an Extreme Danger Level-Field... all other non-fortress hexes are High Danger areas. Treat a league as a mile in *DQ*.

The 13 Enchantments in *Albion* can be worked into a *DragonQuest* campaign in the following manner: 01, 03, 04 are powers of a particular Magical Item, rather than being types of Spells or Rituals. 02 and 13 are functions of particular hexes in Albion (e.g., they are special powers inherent in a particular location and work just like Talents. 05, 06, 07, 08, 09, 10, 11, 12, are a special type of Ritual which can be performed by any Magic User with 120+ points of Rank in magical Spells, Talents and Rituals. They are learned at a cost of one month's study and 500 sp from an Adept who already knows them. These Rituals may be listed on a Character Record by writing the letter "a," followed by the number of the Ritual on the Enchantment Summary. The Magic User must occupy the appropriate area listed in the *Albion* rules and must conduct an extended Ritual in order to cast these Enchantments. The Ritual has a Base Chance of 5% per full day spent in the performance of the Ritual (minimum of 1 day and maximum of 15). Casters may stop to eat and sleep for 8 hours in every 24, but may do nothing else during the performance of the Ritual. Adepts may *not* work in relays (e.g., only *one* caster may perform each Ritual). These Rituals will work *only* in the area shown on the *Albion* map and should not be implemented in *DragonQuest* campaigns in other worlds since they are so powerful. The results of each of the 13 Enchantments listed in *Albion* are discussed in the Enchantment Summary on page 10. Persons cannot achieve Rank with these Rituals.

The Magic Items in *Albion* work exactly as described in the Magic Item Summary on page 10. These items operate according to the rules governing Magic Items in the *DragonQuest* supplement, *Arcane Wisdom,* and are consonant with those supplementary rules. Players may use the Magic Items from *Albion* without reference to *Arcane Wisdom* by simply realizing that the magic powers bound into each item are permanent. They do *not* work only temporarily as is the case with magic items formed by means of the Investment Ritual described in the basic *DragonQuest* rules.

In general, conversion rates are as follows: 1 Wound in *Albion* equals 8 Damage Points in *DragonQuest*; 1 point of Magic Strength equals an MA of about 15 and each additional point increases MA by 2 or adds about 20 points worth of magical Ranks (remember, these are *powerful* folks, not your run of the mill dungeon crashers); 1 Mana Point in *Albion* should be translated into an increase of 5 in *all* Cast Chances in *DragonQuest* (thus, a Mana Level of 5 means that all Cast Chances are increased by 25).

The following monsters are common in Albion: all Undead, Riding Animals, Common Avians, Aquatic Mammals, Other Sea Creatures, Giant Humanoids (other than Titans), Fairy Folk, Earth Dwellers and Creatures of Night and Shadow, all Elementals, Hellhounds, Unicorns, Nagas, Wyverns, Suarime, Salamanders, Giant Land Turtles, Basilisks, Manta Rays, Pike and Sharks, Gryphons, Gargoyles, Harpies, Wolves, Weasels, Rats, Stags, Oxen, Boars, Bear, Wild Cats, House Cats and Neanderthals. Other types of monsters should not normally appear and the GM should choose from among those listed above for encounters. The Encounter Table may still be used if permissable monsters are substituted for those that do not fit into Albion.

In closing, a word on character relation-

ships and the social structures of Albion might be in order. Elves and Dwarves (Gnomes in *Albion* terminology) are very closely allied in this world. Both are faced by the menace of the Stone Giants *and* by the increasing depredations of mankind.

Men are *not* the most common entities in Albion (unlike a normal *DragonQuest* world...but, then, this *is* the Land of Faerie). In fact, men are late-comers to Albion and are second class citizens even to their reluctant allies, the Stone Giants. Human culture is primitive, semi-tribal and utilizes a system of obligations similar to that which may be found in pre-Norman Britain.

Elvish and Dwarvish cultures are extremely well-developed, though Elvish culture is definitely on the wane. Both have a strong urban element. The culture of the Stone Giants is a pure clan culture, its divisiveness mitigated only by the custom of fol-

MAGIC ITEM SUMMARY

01. *The Book of Glamours*

A book of powerful magic written in the Ancient tongue of the High Elves, the Book of Glamours lists all 13 of the powerful Enchantments from *Albion*, and any Adept who performs any of the special Rituals mentioned in the Enchantment Summary accompanying this article while reading from this book automatically casts the Ritual (no dice roll is necessary and Backfire is impossible). In addition, it takes only 1 full day to perform those Rituals which normally take from 1 to 15 days.

02. *The Book of Gyres*

Works in exactly the same manner as 01 except that the only Enchantment affected is the Enchantment of the Elements and non-Adepts can automatically cast the spell (as if they were Adepts) by reading the book aloud in the appropriate area.

03. *Bran's Curse*

This fabulous treasure is valued at in excess of 150,000 GP's. However, it bears the curse that whoever sees it will desire it above all else (including honor) and will perform any crime to gain any or all of the treasure. Treat as a Geas with a Rank of 70 expressed in the following words: "You will do everything in your power to acquire *all* of this treasure." The Geas takes effect upon Humans (only) immediately upon their looking at any part of the treasure.

04. *Colt Pixy*

The plant has the effect of a Spell of Invisibility (S-8) of the College of Sorceries of the Mind except that it affects all persons within 15 feet of the bearer of the herb (who need not be an Adept), is always automatically successful and lasts so long as the herb is carried in plain view. If the herb is concealed in a sack or otherwise kept away from sunlight, it will cease to function since it requires sunlight for its effect. Once returned to the sunlight, it immediately begins to function again. The herb deteriorates at the rate of 10% efficacy per month (add 8 to the Perception of each observer per month since the herb was picked).

05. *Dana's Torque*

The Willpower of the wearer is increased by 50% (round up) and may cause the earth to quake as in the Earth Tremor Spell (S-22) of the College of Black Magics, but with a radius of 2 Leagues. The quake is initiated simply by the wearer willing it and the tremor lasts 30 seconds. There will be a radius of 15 feet around the wearer that will *not* be affected, however. Non-Adepts may freely wear and use the Torque.

06. *Finn's Rade*

The Finn's Rade artifact is actually the scroll containing the bans for the marriage which the members of the Rade were celebrating when slain. The Rade, itself, consists of 500 ghostly revelers who wander about Driffeld Knowe. The ghosts specialize in enticing their victims to join them (instead of scaring them to death as is the normal ghostly practice), and they appear far more corporeal than normal ghosts. Consequently, they are extremely dangerous and are likely to trick an unsuspecting party into some dangerous trap (a treacherous bog, for example) before the members of the party are aware of the malevolent nature of their hosts. The artifact gives total control of the Rade (similar to a Control Spell) to whoever is in possession of it.

07. *Gwydion's Staff*

Only Adepts with combined Ranks of 120+ in magic Spells, Talents and Rituals may use this staff. It immediately increases the user's Cast Chance by 20 and his Magic Resistance by 30. Only Elves (or half-elven persons) may use the staff. All others suffer 2D10 points of damage to Endurance whenever they attempt to use the staff.

08. *The Mailcoat of Gofannon*

A bejewelled coat of silvered mail, the mailcoat weighs 10% of the weight of normal chainmail, may be used by Adepts without prejudice to their magical functions, absorbs 9 points of damage per hit and makes the wearer impervious to the Hand of Torbay.

09. *Nuada's Helm*

The wearer of this helm has his Willpower and Perception each increased by 5, his Physical Strength increased by 3 and his Agility and Manual Dexterity each increased by 2. In addition, the helm absorbs 2 points of damage as a result of the magical aura it casts about the wearer. It can be worn in addition to other armor.

10. *The Red Cleaver*

This Battle Axe does +5 damage and may be used by anyone, regardless of PS or AG, without penalty. The item also confers good luck on the bearer so that any *physical* blow has its chances of landing for damage to the bearer decreased by 10. Magical Spells are not affected (but blows from magical weapons are). Otherwise, treat as a normal Battle Axe.

11. *Lyme's Hammer*

This weapon has the property of draining energy from those it strikes and transferring it to the wielder of the weapon. Each time damage

ENCHANTMENT SUMMARY

The 13 Enchantments in *Albion* have the following effects when employed in *DragonQuest* campaigns and adventures.

01. *Shake the Earth*

See Magic Item 05.

02. *Enchantment of Farcalling*

Any Enchanter (Adept with 120+ points of Rank in Spells, magical Talents and Rituals) who occupies Denby Plinth may spend 1 to 15 days attempting to call a friend or ally to him with a chance of success of 5% per day spent in calling. The person called will, if the attempt is a success, experience a need to go to the source of the calling and will experience a sense of urgency in this regard, though he will not know why.

03. *Scrying Enchantment*

See Magic Item 10.

04. *Enchantment of the Elements*

See magic Item 02.

05. *Enchantment of Storm Calling*

Any Enchanter occupying a coastal hex may call a Full Gale which will arrive in 24–48 hours, occupy the entire sea bordering the hex and last for two weeks.

06. *Enchantment of Fimbulwinter*

Any Enchanter occupying a mountain hex may call down a blizzard upon all of Albion as a result of this ritual. The blizzard will arrive in 24–48 hours and will last two weeks.

07. *Enchantment of Rainmaking*

The caster calls monsoon-like rains upon all of Albion which arrive within 24–48 hours and last for two weeks. (**Note:** The precedence established in *Albion* rules for 04, 05, 06 and 07 is maintained when these Rituals are employed in a *DragonQuest* campaign and may prevent some enchantments from being effective.)

08. *Enchantment of Mental Attack*

Enchanters who occupy their home hex *or a safe place* where they can leave their body undisturbed may enter a trance as part of this Ritual. During this trance, they will leave their body and seek out any foe within a number of Leagues equal to their Magical Aptitude. The two persons then engage in combat as if they were in each other's physical presence (fight an arena combat using the blank hex grid side of the *DragonQuest* Tactical Display). Treat this combat as a Duel Arcane in that it *must* be

lowing a common warchief (the so-called Speaker of the Clans) in times of trouble. Large family units of 8 to 30 will exist in isolated mountain glens, but rarely will the great Brochs, which are clan seats of power, house more than 500 Stone Giants (while the average human settlement might have twice that, a Dwarvish city ten times that and an Elvish Knowe three times that). Contacts with the rest of the world will be rare for all dwellers in Albion, though men will be more active in this regard. In this insular area, travellers will be shunned and only long-standing allies will have any claim of trust from the locals. Common adventurers will normally be despised and sometimes killed outright where they are of a different race. More frequently, they will be jailed by the citizenry unless protected by some patron of great stature. Only the hardiest souls need cross the seas into Albion! □□

is removed from *Fatigue* as a result of a blow from Lyme's Hammer, 1 point of Fatigue is added to the striking character's Fatigue for every 2 points of Fatigue subtracted from the target. However, the bearer of the Hammer cannot have his Fatigue increased beyond his maximum Fatigue Rating in this manner. Otherwise, treat as a War Hammer.

12. *Trollbane*

This Great Axe does +12 damage and has a BC of 70. Otherwise, it has the same properties as any other Great Axe. Due to the great fear of the "Trolls" for this weapon, any time it is used in a fight against a Stone Giant, there is a chance that the Stone Giant(s) will run away (each Stone Giant within 10 feet must roll successfully against Willpower on D100 each Pulse or spend the run running away from the wielder of Trollbane).

13. *Brigit's Cloak*

The wearer (who may be a non-Adept) is completely invisible except for those parts of his body not covered by the cloak (it has a hood and is ankle-length on a man-sized figure).

14. *Gerflax' Wand*

The bearer, if an Adept, may will a circle of invisibility to extend from the tip of the wand 15 feet in all directions, making those within the circle invisible to anyone outside of it. In addition, the weather for 2 Leagues in all directions from the bearer will always be fair and sunny during the day (with some light rain occurring very late at night).

15. *The Hand of Torbay*

Anyone touched by the wearer of this glove must roll against Endurance on D100. If the result is greater than Endurance, the person suffers a number of points of damage to Endurance equal to the difference between the dice roll and the person's Endurance.

16. *Herla's Ring*

The wearer of this ring (may be a non-Adept) sees at will what is happening everywhere he chooses to look to a distance of 3 × MA in Leagues. The wearer *must*, however, have been to the place he is attempting to look into at some time in the past (e.g., must have some sort of familiarity with it) or must *know* a specific person in that place and have reason to believe that the person is there.

17. *Misha's Rod*

The bearer automatically senses the presence of magic. Items or persons of a magical nature (having a spell cast over them) glow in the eyes of the bearer, and he has a chance equal to his MA of detecting the *nature* of such magic after a few minutes study. The rod may be used to heal one person per day of D10 points of damage. Only an Adept may use the rod for healing or to determine *types* of magic, but *anyone* may detect magic auras.

18. *The Moray Crystal*

An Adept may look into the crystal and determine the whereabouts and identities of any potentially hostile entities within a radius of 6 Leagues. It takes 6 hours per sitting to effectively sort out the vast amount of information provided and the Adept must concentrate on the crystal the entire time.

19. *Ogme's Axe*

Treat as Trollbane except that Stone Giants are not afraid of the item.

20. *The Scrying Glass*

This glass allows the user to read the minds of any persons within a range of 20 Leagues. Only Adepts may use the glass and the glass will work only for someone attuned to it. The glass will be attuned to only one Adept at a time and remains attuned to that Adept until the Adept dies. Dobie can use the glass at twice the normal range.

21. *The Staff of Dunatis*

The bearer receives an adjustment of 5 in his favor on all D100 dice rolls and a 10% adjustment in all other dice rolls in his favor. May only be used by an Adept. Treat as a Quarterstaff for combat purposes.

22. *The Sword Requiter*

The bearer has his PS, AG and MD increased by 3. Treat as a Broadsword. The slayer of the bearer will thereafter be cursed with a modification of 10 against him on all D100 dice rolls. Treat as a Major Curse. In addition, any Stone Giant or Human attempting to draw or even pick up the sword must immediately check against Endurance exactly as described under the Hand of Torbay.

23. *The Teeth of the Dragon*

The Worm has 107 teeth and a skeleton (with maximum characteristics) will spring up in D10 seconds wherever each tooth is cast. The skeletons will obey the individual (including a non-Adept) who cast the teeth in all things. They remain animated so long as the caster maintains a slight concentration on them (e.g., through practically anything except the caster falling asleep). Once deactivated, the skeletons crumble to dust. Each tooth may be used once. □□

to the death (no quarter may be shown). Since the combat takes place on the astral plane, no one else can interfere. However, the consequences of the combat will manifest themselves on this plane in the form of mysteriously appearing abrasions, contusions, etc.

09. *Enchantment of Vortex Creation*

The caster creates a number of magical tornadoes equal to his MA within an area four Leagues across that is entirely within a range equal to his MA in Leagues. The vortices appear within 24 hours of the Ritual being performed and remain in the area for D10 days.

10. *Enchantment of Mind Control*

This Ritual works exactly like the Spell of Controlling Persons (G-7) of the College of Sorceries of the Mind except it has a range equal to the caster's MA in Leagues and uses the Base Chance listed in this article's enchantments.

11. *Enchantment of Dispelling Magic*

This Ritual works in exactly the same manner as the Ritual of Dissipation (Q-1) of the College of Naming Incantations except that it has a range equal to the caster's MA in Leagues and affects *all* magic (Spells, Rituals and Talents) in a 4 League square area. The effects will last for D10 hours after the Ritual is successfully completed, so it will be impossible during that time for Talents to operate within the affected area or for new Spells or Rituals to be cast.

12. *Enchantment of Strength*

The caster and the target must be touching (and the Ritual cannot be performed over oneself). The object of the spell has his PS doubled for D10 days, after which he suffers a Fatigue loss equal to the increase in PS. If the loss reduces Fatigue to "0," the balance is subtracted from Endurance. If Endurance is reduced to "0," the object of the Ritual dies.

13. *Enchantment of Vision*

Persons occupying Derg Donnegal, Derwent's Watch, Ravenglass, the Denby Plinth or the Seat of Moray may perform this Ritual. Once successful, the caster may observe the actions, conversations, etc., of any one party of persons within a range equal to the caster's MA in Leagues. The effects last as long as the caster continues to maintain concentration on the object of the Ritual (he may eat and talk, but not sleep or perform violent action or his concentration will be broken). □□

CHARACTERISTICS SUMMARY FOR DWELLERS IN ALBION

PERSON	PS	MD	AG	EN	MA	WP	FT	PC	PB	ASPECT	TYPE	COLLEGE	SPELLS		SKILLS		WEAPONS	
Angus Mac Og	20	19	20	19	17	23	23	22	22	Life	Elf	39	30	4	7	6	9	5
Arwan the Black	21	21	23	19	18	22	23	20	21	Moon	Elf	44-1	28	5	7	5	10	6
Auberon the Short	8	22	22	12	21	23	17	22	17	Life	Elf	36	34	9	10	5	6	4
Balor One-Eye	30	22	20	23	10	20	23	23	6	Death	Giant	-	-	-	5	4	4	3
Barguest the Dwarf	26	20	18	21	22	22	22	20	18	Vernal	Giant	40	25	5	4	5	3	4
Bogan Redcap	28	20	18	23	10	22	24	18	16	Winter	Giant	-	-	-	3	4	5	4
Bran Og	22	21	22	21	10	16	22	17	18	Winter	Human	-	-	-	2	6	8	5
Branwen the Fair	12	20	20	17	21	21	24	20	26	Moon	Elf	44-1	26	8	11	4	5	3
Brian Mac Iver	20	20	22	21	10	21	22	20	16	Death	Human	-	-	-	4	5	6	4
Brigit Shieldmaiden	17	20	22	19	22	20	24	19	24	Life	Elf	36	30	4	5	4	7	5
Cait Sith	35	16	32	29	35	38	36	30	4	Death	Demon	37	28	13	6	10	-	-
Callach	13	19	15	18	21	23	22	23	8	Death	Human	46-3	40	4	4	4	2	4
Callach's Waff	25	20	15	20	25	25	25	25	3	Death	Wight	44-2	23	0	4	4	2	4
Cluracan the Bold	21	21	20	19	19	21	23	20	24	Life	Elf	37	25	5	3	5	6	5
Colleran the Brave	20	20	23	18	15	18	23	19	20	Sun	Elf	38	14	2	4	3	6	4
Connan the Avenger	31	22	21	24	8	21	25	18	13	Death	Giant	-	-	-	5	4	5	5
Corin the Shaper	15	20	18	18	22	24	24	24	20	Death	Elf	47	20	15	7	9	3	4
Cormac Sweetongue	23	21	21	23	12	19	23	19	14	Sun	Human	-	-	-	3	8	7	5
Dagda Silverhair	21	22	19	18	20	22	23	19	23	Life	Elf	36	29	5	5	7	8	5
Dando Redhand	23	22	22	23	11	18	23	21	20	Death	Human	-	-	-	6	9	9	6
Dobie the Scryer	19	17	16	23	23	18	23	16	14	Death	Human	45	23	4	4	3	3	2
Dorwen Trollslayer	22	23	23	22	16	19	24	23	17	Death	Elf	43-1	28	4	7	7	8	6
Dunatis the White	22	23	24	22	22	24	24	24	21	Life	Elf	36	33	15	11	8	4	5
Elidor, Crown Prince	21	20	22	21	16	20	24	17	25	Life	Elf	39	23	4	4	3	7	5
Erskine Deepdelver	19	18	19	18	13	25	21	24	18	Life	Dwarf	43-1	25	3	5	6	5	3
Finvarra	20	20	21	20	22	20	24	21	21	Life	Elf	36	30	8	6	8	8	4
Gairloch the Swimmer	28	21	17	22	19	20	22	20	16	Moon	Giant	41	20	5	4	7	5	3
Gerflax Haefay	20	23	22	20	22	24	24	24	23	Life	Elf	36	32	13	9	7	3	4
Glastyn Bearkiller	27	22	19	22	16	21	23	21	12	Death	Giant	43-2	20	3	3	5	5	3
Grogan Blackheart	29	21	19	22	9	19	22	19	15	Sun	Giant	-	-	-	4	4	4	3
Imric Troll-Lord	31	22	21	24	20	22	23	23	17	Moon	Giant	44-1	25	4	6	8	5	5
Mad Ainsel	18	20	20	17	16	19	21	19	22	Vernal	Human	-	-	-	2	3	3	6
Magog the Cruel	31	21	21	23	19	22	23	19	12	Death	Giant	43-2	25	5	3	5	4	6
Malekin	16	19	19	17	21	25	21	23	10	Death	Dwarf	42	28	7	6	7	3	3
Midinhir the Protector	20	21	22	19	19	20	23	22	25	Moon	Elf	44-1	26	5	7	6	8	5
Misha the Wise	22	23	23	21	21	24	24	22	26	Life	Elf	39	40	12	10	10	3	4
Morigu the Enchantress	18	20	22	18	20	20	24	22	20	Moon	Elf	39	25	6	5	8	4	5
Ogme Ironfist	22	21	24	21	21	21	24	18	15	Sun	Elf	43-1	28	4	3	9	9	6
Rurik Elfbane	31	22	21	25	8	17	23	18	10	Death	Giant	-	-	-	4	7	5	7
Sean the Rhymer	19	21	21	19	22	19	23	23	23	Life	Elf	39	32	7	6	9	3	5
Spriggan the Warder	20	17	20	19	17	23	21	22	16	Life	Dwarf	43-1	22	4	4	6	4	4
Trumpin Halfhand	24	21	22	21	16	21	22	19	14	Life	Dwarf	43-1	20	4	5	7	3	4
Wild Edric	19	21	24	19	19	22	23	21	22	Life	Elf	39	30	5	7	7	6	5
Worm of Mousa Stour	350	20	19	95	23	30	150	30	2	Death	Green Dragon	37	29	11	4	10	-	-

Key: **PS** = Physical Strength; **MD** = Manual Dexterity; **AG** = Agility; **EN** = Endurance; **MA** = Magical Aptitude; **WP** = Willpower; **FT** = Fatigue; **PC** = Perception; **PB** = Physical Beauty; **Aspect** = The person's Aspect (*Vernal* = Vernal Stars; *Winter* = Winter Stars); **Type** = Race or Species as per *DragonQuest* rules (*Giant* = Stone Giant); **College** = The number of the section in the *DragonQuest* rules which describes the College of Magic to which the person belongs; **Spells** = The number of Spells known and their average Rank (first number is the number of Spells; second is the Rank); **Skills** = The number of Skills known and their average Rank (first number is the number of Skills; second is the average Rank); **Weapons** = The number of Weapons in which the person has Rank and the average Rank of those Weapons (the first number is the number of Weapons; second is average Rank). **Note:** In some cases a Magical College is followed by a second number. This indicates the number of the school within the College to which the Adept belongs (e.g., 44-1 indicates that the Adept of the College of Celestial Magics is a Star Mage since Star Mage is the first school listed under that College).

WEAPONS TABLE

	Possession				Rank			
WEAPON	ELF	GIANT	HUMAN	DWARF	ELF	GIANT	HUMAN	DWARF
Dagger	10%	95%	20%	25%	4	8	2	5
Knife	90%	5%	80%	75%	6	3	5	6
Short Sword	10%	P	25%	P	3	P	4	P
Hand Axe	10%	P	15%	20%	2	P	3	3
War Club	P	20%	5%	P	P	4	3	P
Mace	5%	P	5%	5%	2	P	3	2
War Hammer	10%	P	5%	30%	3	P	3	4
War Pick	5%	P	5%	10%	2	P	2	4
Battle Axe	50%	10%	10%	25%	5	2	3	4
Mattock	10%	10%	5%	40%	3	2	2	4
Great Axe	60%	20%	30%	50%	5	4	4	5
Giant Axe	P	60%	P	P	P	5	P	P
Giant Mace	P	10%	P	P	P	3	P	P
Javelin	40%	P	20%	P	7	P	4	P
Spear	10%	P	50%	5%	3	P	4	2
Great Glaive	P	20%	P	P	P	4	P	P
Great Spear	P	10%	P	P	P	4	P	P
Sling	30%	5%	40%	5%	6	3	4	3
Short Bow	10%	P	30%	5%	4	P	5	3
Composite Bow	30%	P	P	5%	5	P	P	2
Great Bow	10%	5%	1%	5%	4	3	2	3
Giant Bow	P	10%	P	P	P	4	P	P
Throwing Dart	5%	P	10%	1%	4	P	6	3
Garotte	5%	1%	15%	5%	3	1	3	3
Shields	70%	5%	50%	60%	4	2	3	3

Notes: The first four columns give the percentage chance that one of the persons in *Albion* will *own* (though not necessarily be carrying) a particular weapon. The second four columns give the average Rank that the person will have with the weapon. A **P** means that the weapon will *never* be owned by persons of that race (for physical or cultural reasons).

SKILLS TABLE

	Possession				Rank			
SKILL	ELF	GIANT	HUMAN	DWARF	ELF	GIANT	HUMAN	DWARF
Alchemist	10%	1%	5%	1%	9	1	5	1
Assassin	5%	1%	15%	5%	3	2	6	4
Astrologer	10%	5%	5%	1%	7	6	5	2
Beast Master	80%	50%	65%	40%	9	7	7	4
Courtesan	1%	1%	5%	1%	1	1	3	1
Healer	90%	20%	40%	50%	8	4	4	5
Mechanician	40%	30%	40%	60%	3	2	3	5
Merchant	5%	5%	30%	45%	2	1	5	4
Military Scientist	85%	100%	60%	75%	8	8	6	7
Navigator	45%	5%	10%	5%	5	2	3	1
Ranger	75%	95%	50%	70%	8	9	5	6
Spy	25%	10%	40%	15%	3	2	5	3
Thief	1%	5%	35%	5%	2	2	4	3
Troubadour	80%	5%	15%	20%	6	2	4	4

Notes: The first four columns give the percentage chance that one of the persons in *Albion* will possess a particular Skill. The second four columns give the *average* Rank that person can be expected to possess. The Worm and the Cait Sith are not covered by this table. Callach's Waff will have whatever Skills and Rank Callach had when alive. Note that those Elves called Ancients (Sean, Corin, Dunatis, Misha and Gerflax) will have a 20% higher chance of having a particular Skill than their Elvish cousins and will have an average Rank 3-10 higher (depending upon person). ■■

Reader's Report

In the last isue of *Ares*, I mentioned that I would tell you which game proposals have been feeding back well. The list of the top ten games follows:

RANK	TITLE (ISSUE OF PROPOSAL)
1	Alien City (6)
2	Universe (4)
3	Return of the Stainless Steel Rat (2)
4	Ghostship (4)
5	The Sagittarian Encounter (8)
6	The Forever Ship (7)
7	Bolo (4)
8	Foundation and Empire (4)
9	Empire of the Stellar Reaches (4)
10	Galactic Trader (4)

We have already published or will publish five of the games on the list (*Universe, Return of the SSR, The Damocles Mission (Ghostship)* in *Ares* 13, *Empires of the Stellar Reaches* as *The Sword and the Stars*, and *Galactic Trader* as *Star Trader*). We are currently negotiating for permission to do *Bolo* and *Foundation and Empire* in future issues of *Ares*. The last three suggestions are still under consideration; they all were proposed using a *Voyage of the Pandora/Citadel of Blood* game system, and we do not want to overwork such a popular gaming approach.

What is of interest is that *all* the best rated proposals have a science fiction theme. In general, science fiction proposals do much better than fantasy proposals. The best rated fantasy proposal — which is not really fantasy at all, but horror — is *Horror Hotel* (which will appear in *Ares* 14). To give you an idea of how low fantasy games generally rate, here is a list of the ten worst rated games:

RANK	TITLE (ISSUE OF PROPOSAL)
1	Jack the Ripper (2)
2	StarGods (2)
3	Corporate Wars (1)
4	Aquarius Mission (5)
5	Across the Warp of Time (6)
6	Once and Future King (6)
7	Fane the Mad (1)
8	Psi Fi (5)
9	The Lost World (4)
10	A Clash of Sorcery (7)

Six out of the ten titles are fantasy (though to be completely fair, *Once and Future King* and *Across the Warp of Time* were offered in several configurations — some configurations doing better than others). In general, a fantasy game proposal usually does not score higher than about 70 or so, making either the game proposals or the reader reaction rather tepid.

One feedback question asked your response on a scale of 1 to 9 as to where your interest lay towards science fiction or fantasy. A response of 5 indicated equal interest. The overall response to the question was a little over 5. Thus, we are a bit puzzled in that you express interest in fantasy games, but they are never rated very high in the feedback.

Michael Moore

The 11 Billion Dollar Bottle of Wine
The Possibilities of Interstellar Trade

by Greg Costikyan

Given what scientists say about the probability of intelligent life in the galaxy, it seems almost inevitable that, sooner or later, we will come into contact with another technological species. We can expect that the same kind of interrelationships which existed between primitive peoples on our planet will occur between the two species.

There are basically two ways which individuals or groups can interact — peacefully and violently. Peaceful interaction implies voluntary exchange between two groups which benefit both — that is, trade. Violent interaction implies the attempt by one group to coerce another — that is, war. Much attention has been paid to the second possibility in the gaming field, but only recently has much been paid to the first.

The reason trade exists is that different groups are efficient at doing different things. For example, let us say there are two countries, A and B. A takes 15 man-hours to make a widget, but only 5 to make a thingummy. B takes 5 to make a widget and 15 to make a thingummy. Suppose each country produces as many thingummies as widgets, and each has 100 man-hours to allocate. Each will then produce 5 thingummies and 5 widgets ($5 \times 15 + 5 \times 5 = 75 + 25 = 100$ man-hours). If A and B now open trade, each may concentrate on producing the item which it produces most efficiently; A will produce thingummies and B widgets. Since a thingummy costs A 5 man-hours, it can produce 20; similarly, B produces 20 widgets. They trade 10 thingummies for 10 widgets, since each wants as many thingummies as widgets. The final result is that each country has 10 thingummies and 10 widgets and each is twice as well off as before. Trade is self-evidently in the best interests of both parties. (Indeed, trade is even in the best interest of both when one party has an efficiency advantage in *both* products, because trade will allow him to shift production into areas at which he is most efficient.)

One problem not taken into account in the above analysis is the cost of transportation (and other barrier costs, such as import and export duties) which raise the cost of doing business with another group. Let us say that it takes 5 man-hours to transfer a unit of widgets or thingummies from country A to country B or vice versa. Each country will then have to allocate 10 man-hours to each unit of a good transported to the other country, and 5 to each unit consumed at home. It is still more efficient for A to concentrate on making widgets and B on making thingummies. However, the best A can do is make 14 widgets (70 man-hours) and transport 6 to B (30 man-hours) while B does the reverse. Each country is still better off engaging in trade than not, but not as well off as they would be if transportation were costless.

This is, of course, an extremely important result for interstellar trade because the costs of transporting anything over interstellar distances is bound to be high, even given some kind of faster-than-light (FTL) drive.

In essence, in order to make trade in a good worthwhile, the cost of creating a good in one location and transporting it to another must be less than the cost of creating it in that distant location. To determine what interstellar trade (if any) is feasible, there are then two questions we must answer, at least in principle: 1.) what are the costs of interstellar transportation, and 2.) what are the costs of production in a highly advanced civilization capable of interstellar trade? Neither question can be easily answered, but we can, at least, make some conjectures.

Costs

In the simple analysis above, we assumed that the cost of production or transportation could be measured in "man-hours." For any more sophisticated investigation, this is inappropriate. An hour of a PhD's time is considerably more worthwhile than an hour of an unskilled laborer's time. Furthermore, such things as the relative efficiency of production machinery (and other capital goods) and the cost of resources cannot easily be measured in man-hours. That is the primary reason why money exists — because it is an easy tool to measure relative costs.

Extrapolating costs into the future is difficult or impossible because technology constantly advances — changing both costs and relative costs — population trends are not entirely predictable, and the cost of resources may change dramatically as terrestrial resources become scarcer and extraterrestrial resources begin to be exploited. However, the cost of transportation is dependent on three primary factors: the cost of building and operating transport vessels, time, and energy required for transportation.

The first factor is very difficult to figure, but the second two are easily calculable, at least for sublight travel. Given a particular transportation system it is possible to calculate the amount of energy needed to move something from point *x* to point *y* in a given amount of time. This will be discussed in more detail later.

Ignoring the cost of maintaining and building a transportation system, the amount of energy needed to transport a unit of mass is roughly proportional to the cost of transporting it. Thus, the less energy transportation requires, the more likely trade can occur and the more commodities it is profitable to trade.

Time is also an important factor, because the longer it takes to transport a good, the further in advance an investor must put up his capital before he will see a return. At sublight speeds, interstellar transportation will necessarily require between 10 and 1,000 years for a round trip. In America, there are few companies who are willing to wait even 10 years for an investment to provide a return. Government tends to think in even shorter terms; the insistence of Congress on space programs which produce short-term return and its reluctance to engage in projects which may prove immensely profitable over a period of decades, but costly in the short-term, is an example of this thinking.

Quite apart from this psychological reluctance to think too far ahead is the very real economic cost of delayed return on investment. When determining whether an endeavor will be profitable, an investor must keep "opportunity costs" in mind. If an investor has a choice of two investments, both profitable, and chooses the one which is less profitable, he has, in real terms, lost money; he could have made more by taking the more profitable investment. If one can earn 17% on one's money in a money market fund, and investing in a small games company is likely to produce a profit of 10%, there is no reason to invest in the company.

If, say, an investor can earn 10% of his money per year by investing in his own planet, over a period of ten years he can increase his wealth by 160%. To be profitable, an interstellar trading voyage would have to generate more profit than this. So the high time required for interstellar voyages result in high opportunity costs. (In 100 years, at 10% an investor would have increased his wealth by more than 15,000 times.) High opportunity costs combined with high transportation costs make interstellar trade extremely (though not necessarily prohibitively) expensive.

Energy Costs of Sub-Light Travel

Many different interstellar propulsion systems have been prosposed, and the energy required for each is different. Since we want to encourage interstellar trade, it behooves us to make relatively optimistic assumptions. In *Ares* nr. 1, John Boardman in-

vestigated the times and costs in energy entailed in using an anti-matter drive capable of 100 percent conversion of energy into gamma rays, accelerating off reaction from such conversion. It is possible to conceive of even less costly drives — such as a ramscoop which gathers its reaction mass en route — but Boardman's drive is at least theoretically feasible while the ramscoop concept has some real technical problems. The Boardman anti-matter drive can then be taken as the most optimistic drive for sublight transportation.

Boardman derived a formula to determine the mass ratio needed between the initial mass of a ship and the mass of the final payload (see "Calculating the Cost of Interstellar Trade," below) assuming the ship accelerated to a given speed, coasted at that speed, and decelerated to rest at its target. He also derived a figure (5704 megawatt-years) for the amount of energy required to produce a kilogram of anti-matter. Combining these two, we can determine the amount of energy needed to accelerate a ship to a given speed and then decelerate to rest. Evidently, the higher the "coasting" speed, the greater the initial investment and the faster the ship will get to its target.

Historically, the US economy has grown at an average annual rate of 3% (corrected for inflation) over the past 150 years. If we assume that net human growth will continue at a rate of 3% in the future, we can calculate the opportunity cost of tying capital up in an interstellar voyage by assuming an average 3% rate of return were the capital invested at home. Obviously, the longer the voyage, the higher the opportunity cost. Compound interest mounts up very rapidly.

The important point is that the opportunity cost goes *down* if the maximum velocity of the ship goes *up* (because the ship gets to its destination and back sooner, so the interest is compounded for fewer years). The initial investment goes *up*, however, as the maximum velocity of the ship goes up (because more energy is required to accelerate it to a higher velocity). Evidently, there is, for a voyage of a given length, a maximum velocity at which the minimum net cost is achieved. Table 1 shows the minimum cost for voyages of several lengths between 5 and 100 light-years.

The cost of the energy needed to move a kilogram of matter at the minimum cost velocity of .23 times light-speed to a point 5 light-years away and back is 6,820 megawatt-years, which at average American prices of 5 cents per kilowatt hour, works out to about $3 billion in 1981 dollars. When including opportunity costs, the total cost rises to about 25,000 megawatt-years, or about $11 billion. Costs increase rather more than linearly; the total cost of a 100 light-year trip is about $64 *trillion* dollars (about twenty times the current US Gross National Product.)

Actually, $11 billion is not bad when one considers that the Apollo program cost around $10 billion. To look at the energy figures, the initial investment of 6,820 megawatt-years is about 3% of the installed electrical generating capacity of the US as of 1975 — it would take 6 fairly large nuclear plants operating full-blast for a year to produce the anti-matter needed for the trip. That is a lot of energy, but it is by no means beyond our capabilities. (Of course, the technology does not exist at the moment, and is likely never to exist at least in the idealized form postulated by Boardman). This limitation implies that sending miniaturized, robot probes to the nearer stars is within the realm of feasibility, and will, barring nuclear war or some other catastrophic end to human civilization, probably occur sooner or later.

However, the cost is *per kilogram*, which means that human beings are unlikely ever to go to the stars, given the mass entailed in the life support system necessary to keep a human alive for several decades.

Standards of Living

Eleven billion dollars is a lot of money — or is it? We have postulated that the economy will continue to grow, world-wide (or perhaps I should say solar-system-wide), at a rate of 3% per annum. Many countries have growth-rates higher than this (and quite a few less), so it seems a reasonable presumption — assuming 1.) technology continues to advance, 2.) we begin to exploit the vast resources available in the solar system off earth, and 3.) economic growth does not get choked off by the continued growth of parasitic government at the expense of the productive sector of the economy (the last is the most questionable assumption).

As an example, let us say that the average individual on the earth commands about $1,000 per year (the figure is probably somewhat, but not much, lower averaged over the earth's population). Figure 1 shows how much money individuals will, on the average, be able to command in the future. Talking of "money" in this context may be confusing; we are talking, actually, about the resources, energy, and goods which an individual commands. The average individual will be able to command $1 billion in about 500 years — which means that he will be able to afford the equivalent of a Cray computer and a fleet of space shuttles. He will not be able to hire huge numbers of domestic servants — because the average servant will, after all, make somewhere around $1 billion himself.

Real economic growth comes from technological advances that permit increased productivity. Mechanization, division of labor, computerization, robots, etc., mean that fewer and fewer man-hours are needed to produce a given good, and thus that individuals can be paid more (in terms of goods and services) than they could be paid under less productive arrangements. There may be a limit to this process, but we are nowhere near it; indeed, mechanization of services (as opposed to industries) has only begun to occur with the computer revolution. Economic growth means a greater ability to command goods and services; it does not mean a greater ability to command others.

Some things, however, are *not* susceptible to growth of this kind. There are only so many Rembrandts; the soil of Burgundy can only support so many *grand cru* vineyards. If a Rembrandt sells for $1 million today, when the average income is $1000, it will sell for $1 trillion when the average income is $1 billion. (All things being equal.)

Historically, per capita energy consumption has been very closely linked to economic growth. Both have increased in the US at an average rate of around 3%. Consequently, as standards of living increase, the amount of energy which an individual can command increases — and his ability to contribute to what now seems an incredibly expensive sublight trading mission increases. If an average income of $1 billion does not make everyone able to own a Rembrandt, it does make it much more possible to engage in interstellar trade. If a Rembrandt sells for $1 trillion, spending $11 billion to import the equivalent of a Rembrandt from Alpha Centauri does not sound so bad.

How reasonable is it to expect that per capital incomes will increase a millionfold over the next 500 years or so? Assume that population increases at a rate of 2% per annum (roughly the current global average). Total energy use will increase at a rate of 5% (3% per capita plus 2% increase in population). Current total world consumption of energy is around 8×10^9 MW-years per year. The sun puts out about 1.28×10^{20} MW; in 500 years at a growth rate of 5%, humanity

TABLE 1: MINIMUM COST JOURNEYS USING ANTI-MATTER DRIVE

DISTANCE	VELOCITY	TIME	INVEST (MW-yrs)	INVEST (1981$)	OM	COST (MW-yrs)	COST (1981$)
5	.23c	43.9	6,820	2.99	3.66	25,000	10.9
10	.38c	53.4	14,000	6.13	4.85	67,900	29.7
25	.59c	86.0	32,800	14.40	12.70	417,000	183.0
50	.74c	136.9	64,900	28.40	57.20	3,710,000	1,630.0
100	.84c	240.2	120,000	52.60	1,120.00	145,000,000	63,600.0

Key: Distance = distance in light-years from earth to star; **Velocity** = maximum velocity of ship as percentage of the speed of light; **Time** = time for a round trip in years; **Invest (MW-yrs)** = Initial investment in megawatt-years per kilogram; **Invest (1981$)** = Initial investment in billions of 1981 US dollars per kilogram; **OM** = Opportunity multiple; **Cost (MW-yrs)** = Total cost in megawatt-yrs per kilogram; **Cost (1981$)** = Total cost in billions of 1981 US dollars per kilogram.

Assumptions: The figures in this chart are drawn using the following assumptions: Boardman anti-matter drive; refueling at destination; vehicle mass neglected; 100% efficiency drive; acceleration = $9.8 m/sec^2$; rate of return on investments at home equals 3%; $.05 in 1981 dollars per kilowatt-hour ($438,000 per mega-watt year).

would consume a little bit more than twice the amount of energy produced by the sun (and the human population would be about 8×10^{13}, eighty-thousand billion people). It seems unlikely that we could produce enough energy to provide the equivalent of a second sun for humanity. However, if we assume the population would level off at 100 billion people, humanity would consume about 5×10^{17} MW, about ½ % of the sun's output. Thus, if we solve the population problem sometime in the 22nd Century, all will be well and our children will be billionaires.

Assume that this picture is over-optimistic. Assume the $11 billion/kg figure is off by a factor of ten, and a better figure is $100 billion/kg. Even today, such a cost, though huge, could be paid. And barring the collapse of civilization, growth *will* continue. The relative cost of interstellar trade should decline. Doubtless, it will never be as common as trans-Atlantic traffic is today; nonetheless, it seems feasible.

Commodities

We said that in order to determine the feasibility of trade in a given good we would have to know 1.) the cost of transportation, and 2.) something about the cost of production of the good. The first question we have answered, and the second we can talk about. If the standard of living has increased a millionfold, what this really means is that the cost of goods has decreased a millionfold. If per capita income increases from $1,000 to $1 billion, an individual can command a million times as much energy or resources. Effectively, we are holding the dollar cost of goods constant while increasing the number of dollars available to individuals.

This being so, it is obvious that common resources and products are not going to be worth trading over interstellar distances. Spending 25,000 MW-years to import a kilogram of lead makes no sense. What might be worth importing?

First, perhaps there are extremely valuable resources which cannot easily be produced in our solar system: monopoles or superheavy metals, perhaps (if such things exist at all). It is hard to conceive of such a thing as a monopole mine, but perhaps they might exist. If, however, there are monopoles on Alpha Centauri because the Centaurians can manufacture them, it is likely that it will be more efficient to purchase the techniques from them rather than to import monopoles.

Which brings up the point that manufactured goods of any kind are probably not worth trading, because given the high costs of transportation, selling the manufacturing technology makes more sense than trading in the goods themselves. What does this leave?

This leaves goods the value of which is not transmittable, which cannot be described and reconstructed, but have somehow intrinsic value. A Rembrandt can certainly be described and the Centaurians could certainly print copies of Rembrandt paintings from information we sent them, but those copies would not be the originals. Lithographs sell for prices about 5 orders of magnitude less than originals at the moment. Originals have intrinsic value; any copy, no matter how perfect, is but a copy.

So one possible category of trade goods is luxury items, not only *objets d'art*, but such things as exotic wines and liqueurs and the like. (I refuse to believe that any reproduction technology, no matter how sophisticated, can reproduce the bouquet of wine to the complete satisfaction of a oenophile. The future may see the trillion dollar wine.)

The last category of goods it might make sense to trade is genetic information, or something similar. Given sophisticated genetic manipulation techniques, getting the raw material — the genetic codes — of alien species might prove extremely beneficial, especially if the species is very alien in biology. By manipulating such beasties, we might be able to engineer new genetic products that could not be created with the genetic material available on earth. On the other hand, the genetic code is a code; and one day we may be able to read the precise order of amino acids on a strand of DNA, and thus be able to precisely describe a gene to an interested party. There is, naturally, a hell of a lot of information encoded in even the simplest bacterium, and transmitting this much information might be difficult. On the other hand, radio data transmission rates have increased by several orders of magnitude over the last few decades, and it may be that we will be able to transmit instructions for building genes in the future, thus obviating the need for trade in genes.

In summary then, though human civilization is likely to be engaged in interstellar trade, there probably will not be much worth trading, since any society capable of doing so on a major scale can probably produce almost anything it needs at home. Trade in esoteric and extremely rare resources like superheavy metals might be possible; genetic material is another possibility. The most likely trade good would seem to be the relatively frivolous trade in luxuries.

Trade via Radio

There are immense gains to be made from trade with other stars through exchange of information. A space-going civilization is almost certain to have developed technologies which we have not, and vice versa. Exchange of scientific information would also be worthwhile, and surely both our cultures would be enriched by exchange of the artistic masterpieces of our two heritages. Such trade would not require physical transportation of objects, however; a more likely possibility is telecommunication. Getting into radio contact with another civilization would be extremely profitable to both of us, and the cost to operate a large radio transmitter would be immensely less than the cost of operating an interstellar trading vessel.

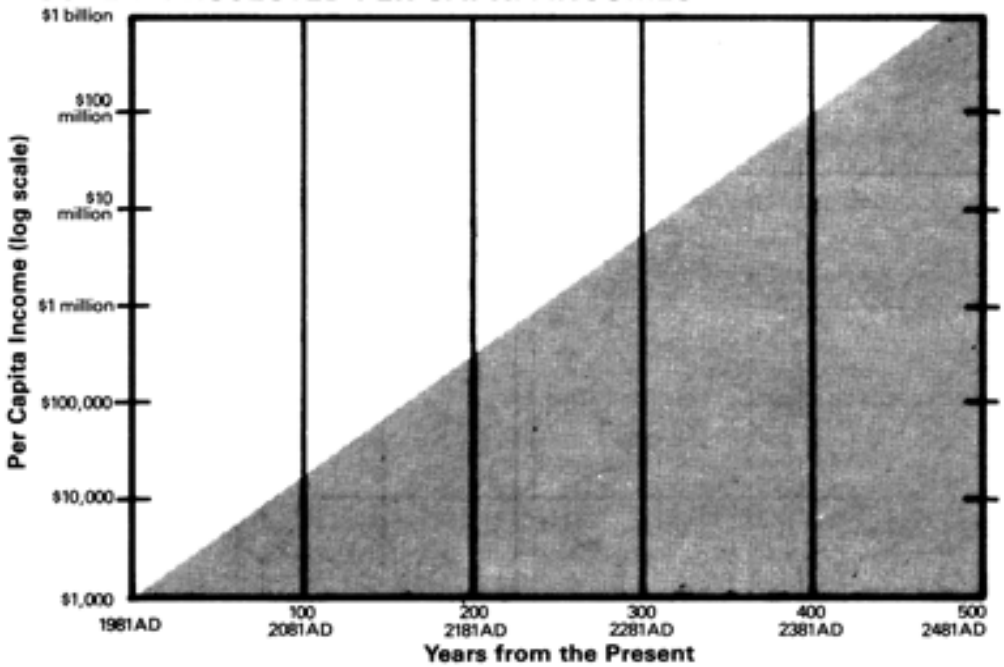
This kind of trade, however, cannot be built on a direct, bargained exchange. If it takes, say, ten years to send a message and get a response, making a deal would be an effort requiring a lifetime. If making a profitable exchange necessarily requires first coming to an agreement on the terms of that exchange, information will be exchanged at a very slow rate. Instead, it seems likely that both of us will transmit whatever information we think the other might find useful or interesting, transmitting other information as requested. In essence, as Asimov suggests in one of his stories, we will both be talking at once. Whether this kind of exchange can even be termed "trade" in the classical sense is debatable since there is no agreed exchange of items of value; but it is certainly a voluntary arrangement benefiting both parties. It is also evidently the most cost-effective and simplest way to deal with alien friends.

Calculating the Cost of Interstellar Trade

The cost C of a round trip is equal to an opportunity multiple (OP_m) times the investment required to make the trip. The opportunity multiple arises from the fact that investment could be made at home instead, and is equal to:

$$OP_m = (1 + I\%)^{2T}$$

FIGURE 1: PROJECTED PER CAPITA INCOMES



where T is the time required for one leg of the journey (out or back) and $I\%$ is the rate of return possible if the money were invested at home instead of on the interstellar voyage.

Ignoring the cost of building and maintaining a ship (as well as the costs of overhead, employees, etc.), the investment required to send a sublight trading mission using the Boardman anti-matter drive is calculated from:

$$I = 2 \times R_m \times P \times 5704\,MWy/kg$$

where I is the investment, R_m is the number of kilograms of anti-matter required per kilogram of payload, the factor "2" entering because anti-matter must be purchased at the destination before the return trip (doubling the cost), and $5704MWy/kg$ the amount of energy (in megawatts-years, MWy) required to produce a kilogram of anti-matter. For a one-way trip, the value of R_m is:

$$R_m = (\frac{c+u}{c-u} - 1)$$

assuming the ship is capable of refueling at its destination, where c is lightspeed (3×10^5 km/sec) and u is the maximum velocity of the ship.

Cost C is then:

$$C = (1 + I\%)^{2T} \times (\frac{c+u}{c-u} - 1) \times 2 \times P \times 5704MWy/kg$$

T, however, is a function of u, the maximum velocity. If we plug an equation for T into the equation for C and assume values for u and $I\%$, we can calculate the cost per kilogram of trade goods. T is determined from:

$$T = \frac{d}{u} + \frac{2}{g}[\frac{c^2}{u} + (1 - \frac{u^2}{c^2})^{-\frac{1}{2}} \times (u - \frac{c^2}{u})]$$

where d is the distance to be travelled and g is the rate of acceleration.

One of the interesting things about the equation for C is that the opportunity multiple *decreases* as u increases (because the journey takes less time) while the investment *increases* as u increases (because more anti-matter is required). This implies that there is, for a given set of conditions, some maximum velocity u at which minimum cost is achieved.

Table 1 shows minimum costs for a number of journeys of different lengths. Assumptions used in deriving the table are: Boardman anti-matter drive with refueling at destination; acceleration = 9.8m/sec²; rate of return on investments at home = 3% (approximately equal to the historical average rate of growth of the US economy); and 5 cents in 1981 US dollars per kilowatt-hour ($438,000 per megawatt-year).

Trade Faster than the Speed of Light

In this article, I have talked about the possibilities of sublight trade at some length. Trade in FTL vessels may be a more interesting topic, despite the fact that FTL will probably never exist.

The problem is that any FTL drive will necessarily depend on physical principles of which we have not the slightest glimmer at the present time. Consequently, we can not make any assumptions and have no real way of speculating about the costs of such trade or the forms which it will entail. The basic principles, however, remain the same. The lower the cost of transportation of goods, the more trade will go on. One expects that any mechanism for traversing distances measured in light-years is going to be very expensive, even if it involves (or perhaps especially if it involves) somehow transcending Einsteinian mechanics. Consequently, interstellar trade is always likely to be limited. The fact that travel can occur at trans-light speeds means that opportunity costs are much reduced, of course; the cost of building and operating a FTL-drive ship, however, cannot even be guessed at. In the accompanying module, we investigate the costs of travel using the *Traveller* system, and how that system reflects (or fails to reflect) reality. □□

TRAVELLER

The Free Trader, the standard *Traveller* small trading vessel, costs 37.08 Mcr (Megacredits). It is capable of a one-parsec (3.26 light-year) jump every three weeks with normal maintenance; the purchase cost amortized over a period of ten years means an effective cost of 71,000 Cr per journey. Other costs are:

Amortized ship cost	71,000Cr
Fuel, 20 tons at 500Cr/ton	10,000Cr
Maintenance, .1% ship cost per jump	37,000Cr
Total crew salaries for one month	19,000Cr
Total cost per jump	137,000Cr

The cargo capacity of a Free Trader is 82 tons, so the cost of transporting 1 kg a distance of one parsec is about 1-2/3 credits. For comparison, a shotgun costs 160 Cr. This implies that, relative to other costs prevailing in the Imperium, the cost of interstellar transportation is relatively low, and a high level of interstellar trade is to be expected.

However, there is a major flaw in the *Traveller* ship system which Marc Miller apparently does not realize and the implications of which are not reflected in other aspects of the game. The smallest power plant which can be mounted on a spaceship is an A-rating plant. An A-plant consumes 20 *tons* of hydrogen in the course of a standard one-week interstellar jump. Now, starships do not in *Traveller* carry liquid oxygen, so it is clear that the hydrogen is not being burned to create energy. Instead, the power plant must be operating as a fusion device. Further, Miller does not permit ships to separate out the deuterium (heavy hydrogen, the easiest atom to fuse) and use only that to generate power. If he did, ships could carry vastly less fuel and would thus have much more space available for cargo. So the energy must be created by proton-proton fusion of raw hydrogen, tons of which are consumed each week — the same fusion reaction which produces most of the sun's energy. (Actually, considering the energetics of proton-proton reactions, Imperial technology must be extremely advanced, since even at temperatures of millions of degrees, proton-proton fusion occurs very rarely. The Imperium must have some mechanisms for catalyzing such reactions, something beyond the slightest glimmer of our comprehension at the moment.)

In proton-proton fusion, through a series of three reactions, four protons fuse to produce a single helium atom plus about 25Mev (million electron-volts), plus some stray gamma rays, neutrinos, and positrons. H^1 weighs 1.008 g/mole, so 1 kilogram contains about 992 moles of hydrogen, or 5.97×10^{26} atoms. Fusing these atoms produces 3.73×10^{27} Mev. There are 1.60×10^{-19} J/ev, so this is equivalent to 5.97×10^{14} Joules or about 19 MW-years. So there are about 19 MW-years of energy per kilogram of hydrogen.

The smallest power plant which may be installed on a ship in *Traveller* is a standard "A" power plant. The A-plant can consume 20 tons of hydrogen over a period of a week, convert it into energy, and feed it to an "A" FTL drive. (This is how much energy is needed by the smallest FTL drive to make a jump of 1 parsec if installed in a 200 ton ship.) If we assume Miller is using metric tons (1 ton = 1,000 kg), an A power plant then can deliver 380,000 MW-years of energy over a period of one week. Over a year, it could deliver 19,800,000 MW-years. Thus, a single A power plant produces about 86 times as much energy in a year as all of the electrical generating plants in the United States. A single jump in *Traveller* uses about 160% of the energy the US produces in a single year.

A "Jump 1" in *Traveller* corresponds to a travel distance of one parsec, about 3⅓ light-years. Let us be generous and say a ship can travel 5 light-years at Jump 1, consuming 380,000 MW-years in the process. A Free Trader carries 82 tons of cargo, so the cost in energy to transport a kilogram is 380,000 divided by 82,000 or roughly 4.6 MW-years. This is about 5,000 times as good as the Boardman anti-matter drive, so that there is no doubt that interstellar trade in the *Traveller* universe is a good deal cheaper than in an Einsteinian one.

It still takes 6.7 million KW-hours of energy to transport a kilogram, however. That is a lot of energy. Now it is true that energy is very cheap (in terms of Imperial credits) in *Traveller* — it has to be given the cost of owning and operating an "A" power plant — but the cheapness of energy means that other manufactured goods must also be very cheap. So there still will be few goods worth trading in *Traveller*. What goods will be worth trading is debatable, since it is very difficult to estimate costs of production. However, certainly trade in bulk goods like metal ores, pig iron, or grains can be ruled out. The *Traveller* trading system does make it possible to make a profit trading such goods, but that is a peculiarity of the system. I think we can say with some assurance that in *Traveller* the primary items of trade will be 1.) luxuries, 2.) extremely rare resources such as superheavy metals and — possibly — radioactives, and 3.) high-tech goods to be sold on planets where they cannot easily be produced locally. ■■

Designer's Notes

DragonQuest

In a recent staff meeting we discussed the future of *DragonQuest* products. We are well aware that the *DQ* playing public is clamoring for more material, and we are trying to work new products into our crowded schedule for the upcoming year. After much discussion we did decide several things:

1. Steve Jackson (of Steve Jackson Games) has finished the *DQ* World Generation project which *will* be published next summer for one of the conventions. It will most likely appear as a softbound book approximately 128 pages long.

2. Sometime next year *DragonQuest* Adventure #4 will see the light of day. Tentatively, I am scheduled to design it.

3. We plan to contract an individual (or group of individuals) to design a complete city supplement/adventure to be published during the summer convention season.

4. A combined Advanced Skills/Monsters supplement is planned for the HIA show in early 1983, which I will design with the assistance of playtesting groups around the country. Also, at the show will appear *DQ* Adventure #5, and there may be a surprise with this one, so stay tuned!

5. Planned, but not scheduled, is a *DQ* army combat game, allowing characters to lead armies into battle and provide systems for the resolution of those combats. This game may or may not appear in *Ares*.

6. The future of the Alusia map series is uncertain. Sales so far have not justified the continuance of the project, but we feel a debt to those who await the rest of the maps. One possible solution is to use *Ares;* instead of the normal issue game, we would publish an Alusia map along with an adventure game using a simplified version of the *DQ* role-playing system that would be played on the map.

7. Starting with issue nr. 13 of *Ares*, we will publish a capsule role-playing adventure in each issue, and the entire role-playing section of the magazine will be expanded to include more supplemental rules material and playing aids. This section will cover both *DQ* and *Universe* and will be a sort of "magazine within a magazine." We are currently soliciting adventures; if you are interested, please send me a query letter (include a self-addressed, stamped envelope), but do *not* send an unsolicited manuscript (they will be returned immediately, unread).

We are anxious to hear your comments on the above suggestions and your ideas for new products. Also, we would like to hear from groups interested in playtesting new adventures and supplements. We are further interested in sponsoring readers who would be willing to GM *DQ* adventures at conventions, and we would provide prizes and support; please contact me directly if you are interested in such an endeavor.

The *DragonQuest Second Edition* book has just arrived from the printer and it is *gorgeous*. It should be available now at your retailer, and I expect you'll agree with me that it is the best looking role-playing rules book on the market, bar none. Meanwhile, back to my laboratory to work on *Arcane Wisdom*.

Gerry Klug.

The Damocles Mission

No sooner had I written the last progress report concerning how a paragraph system wasn't going to work when I figured out how to make it work. Oh well, so much for decisions made in haste. At any rate, the game plays like this: A huge sphere (1km in diameter or so) has entered our solar system and parked itself in a geosynchronous orbit right over North America. We send the shuttle up to investigate this new satellite. The shuttle carries a team of astronauts and scientists, each with his own skills specialties. The team investigates the "artifact" and tries to figure out what it is and why it came.

The answer to that riddle is not in the paragraphs, but inherent in the logic of the information gained during the investigation. "Winning" or "losing" is not dependent on whether or not you figure out this riddle, but on how well you do in your investigations (getting the ship to activate without hurting yourself). How much time you have to complete the investigation is based on how well you did the last time you played the game — it gets harder to win the better you performed in past playings.

In this solitaire game, each and every playthrough will be entirely different from the last, and there is an infinite number of possible "games" due to the proliferation of random factors: the number and composition of the investigating team (chosen by the player), the equipment brought along (chosen by the player), the amount of time available (a function of the above two factors), the order in which the tiles of the "artifact" are investigated (random each game), the method of investigation the player chooses with each tile, the order in which the sections of the "artifact" turn up, etc. For those of you who figure out the unstated purpose of this new neighbor in the sky, we may have something special planned (it *can* be figured out, by the way).

Gerry Klug

Conan

If you've heard that SPI is doing a game on Conan the Barbarian, you probably heard about it before the designer; the designer is always the last to know. As it is, the game has come through two designs and has finally settled down to the final product design that you, the audience, will see.

Conan is for 2 to 4 players with each of the contestants representing one of the major factions of Hyborea (Conan's fantasy world). Each faction has agents at their disposal with which they attempt to thwart their enemies' plans while enlisting the aid of our fearless hero, Conan. There are five types of agents: Wizards, Warriors, Courtesans, Assassins, and Thieves. Each type of agent has different capabilities and different strategies for enlisting the aid of our hero.

The object of the game is to gain Conan experience points — the more experience points the better. The number of points a player amasses during the course of the game determines the success of Conan's career (while under a player's control) as well as how successfully the player has performed. For example, if a player can amass 50 experience points, Conan reaches the level of Captain of the Imperial Guard, whereas 125 experience points is a kingship for our intrepid hero.

Players can amass experience points only when they are in control of Conan, maneuver him to the proper place and send him on an adventure. Adventures are taken from the Robert E. Howard stories. One such adventure, for example, is called "The Queen of the Black Coast." In this particular adventure, Conan first escapes the police by leaping into a handy trading vessel just leaving port; the ship is attacked by pirates and Conan, alone and surrounded, wreaks bloody havoc (what else?). At the last possible moment, the beautiful captain of the pirates, Belit, falls in love with Conan. They merrily raid the southern coast and each other for a time. Later, they sack an ancient evil city where all the pirates including Belit are killed, and Conan is forced to avenge his love by killing the evil flying man-ape who did the gory deed. For a successful completion of the adventure (utterly obliterating the murderer of Conan's first great love), the controlling player is granted 35 experience points.

Control of Conan is gained by sending agents after Conan and either seducing him (Courtesan), befriending him (Warrior) or hypnotizing him (Wizard). In addition, if Conan can be defeated in combat, he can be controlled (this one is really tough to pull off). Thieves can also steal horses and magic items, while Assassins can kill enemy agents. To make things even more interesting, Wizards who capture enemy Courtesans can sacrifice them to the Nameless One and increase their magic level. Well, back to the Hyborean drawing board... more next time.

Mark Herman

First Contacts

Some time ago we decided to make *First Contacts* the first supplement to *Universe*, SPI's science fiction role-playing game. *First Contacts*, naturally, will contain aliens: three complete alien races, to be precise. I'm designing one and the other two are being designed by John Butterfield, the designer of *Universe*, and Ted Woods, a co-developer of *DragonQuest*. The entire project will be overseen by John.

While John and Ted are still tied up with other work, I've begun work on my race and, in fact, have most of the first draft done. The race is known as the sht'kl'p (pronounced "shtiklip"); they speak not via vocal cords, instead having a membranous drum-like arrangement which sounds like timpani and snare drums.

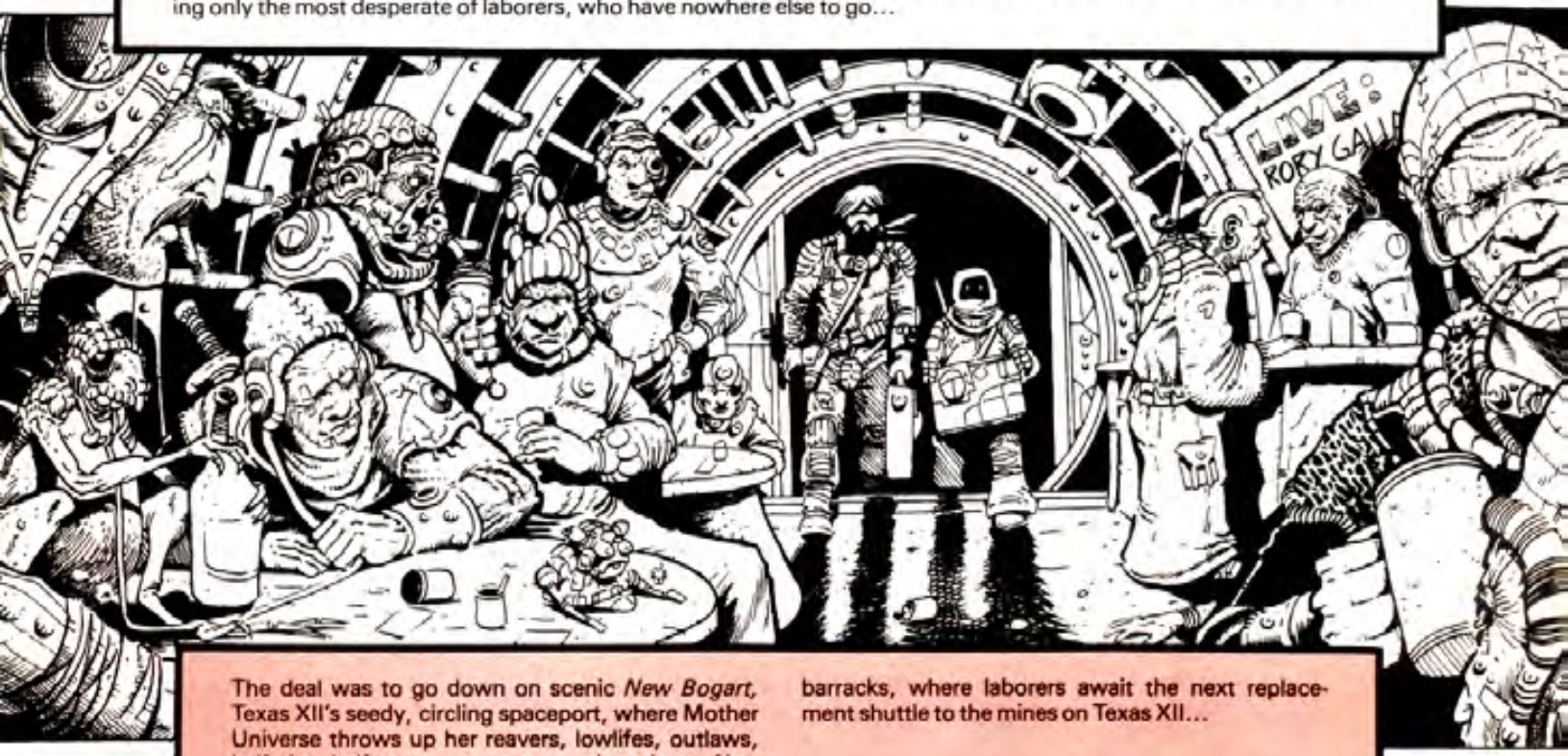
The sht'kl'p are a race of shape-changers. They do have bones and can rearrange the postions of bones only to a limited degree; thus, for example, they can only take on shapes with four limbs since they have four limbs. Additionally, mass is, of course, conserved. Though they are limited shape-changers (as, indeed, is almost all life on their home planet), their primary survival trait is intelligence. On the home planet there are

[continued on page 38]

Log entry 211-51-55BET TAU CETI
by: Commander/Merchantile
Roosevelt Drake, Free Trooper,
Capt., the Flute *Lightnin' Hopkins*

STARTRADER!

TEXAS XII — a big, gassy, inhospitable planet of low g's and high thermite content. Thermite mining there is risky business at best. At worst, it is an absolutely suicidal operation, sponsored by the unscrupulous Eon Flashcorp, and attracting only the most desperate of laborers, who have nowhere else to go...



The deal was to go down on scenic *New Bogart,* Texas XII's seedy, circling spaceport, where Mother Universe throws up her reavers, lowlifes, outlaws, halfwits, halfcastes, uncastes, and unclean. *New Bogart* — a vast, open sewer of gutter smells and human trash. *New Bogart* — a mad, erector-set place of rust-gilt pleasure bars and overcrowded barracks, where laborers await the next replacement shuttle to the mines on Texas XII...

New Bogart — my kind of place...A place where fast, tariff-free money could be made, with no questions asked...

STORY AND ILLUSTRATIONS BY TIMOTHY TRUMAN


We followed his thumb to a door at the rear of the joint. I gave it three slow, hard raps. We heard the hiss of unsealing permalocks. Cautiously, I palmed open the door...
Beneath the glow of a twilamp sat our buyers:
Utli, The Flashcorps' head rep on Texas XII, an influential meddler in Tau Ceti's political arena.
Waldrup, his lieutenant and secretary.
Martyn, a defrocked priest, now employed by the Holyoke Arbitage, Utli's frequent business associate.
I gave a cordial nod. But Mr. Utli was not so cordial. He pointed to the table. "Open the cases."
I casually thumbed open the perma-seals. Hungrily, our hosts craned over the big, open cases, each wanting to be the first to look inside.
"Gentelmen," I said, "I give you — *TEMPUS* — 60 kilos of pure, unhydrated tempus. The most powerful stimulant in any system. And, for the price of 10 million trans, all yours."
Utli smiled, a wolf's smile. The gleam in his eye made me very nervous...
2


Automatically, I went for my needle gun...But not automatically enough...
From the grimy curtains at the back of the bar, a brace of paint guns suddenly bristled...
"RO – ROMERO!" I hissed. "What's all this about!?"
ROMERO: Terrorist, subversive, and thug – a leading conspirator and henchman in the shadowy Association for Interstellar Anarchy. I'd dealt with him before...
"You're a hard man to dupe, Drake. But dupe you we *did,* thanks to the uncommon wiles of Mr. Utli, here. You see, after you contacted him concerning your load of tempus, he contacted us. He offered the AIA half...All we have to do now is get rid of you. Utli distributes his portion to the Flashcorps' holdings here, at further profit. The AIA takes its share to Leporis, to buy guns for the rebellion, and to make political payoffs in Sigma Draconis."
The anarchist smiled, his paint gun leveled at my chest. "Why, it's about *tempus,* dear Drake. Lots of tempus. And lots of money."
"Ah, tempus, Lovely, deadly tempus. And all ours All..."
"...our – eeeYAAAAAAAAAHH-HHHHHHHHH – !!!!!"


It only took seconds. The Terrorists and buyers were on the floor, a helpless, writhing mess.
Romero screamed at me between bubbling gasps. "These — things — G-get them OFF! W-what — what ARE THEY!?!!"
I lit a menthol ashtube as I gathered the tempus. "Why, they're — let's see if I can get this right — *'Rhynochophora Espice Diabolis.'* We call 'em *'spice weevils'* — a mutation peculiar to the Sigma Draconis' spice worlds. Their microscopically small eggs hatch on contact with light, and our earth-normal oxygen assists them to reach maturity at an incredibly accelerated rate. They're a particularly nasty creature — hungry all the time. They have a natural appetite for human flesh, too."
WEEV-X
"I took the liberty of sifting their eggs into this shipment of tempus, as a safeguard. This canister would have taken care of them, though. It contains a rare, powerful exterminating toxin. The weevils *hate* it — it kills them like flies. Totally harmless to humans and most mammals, though. In fact, it makes a rather handy repellant. Silly of me not to mention it earlier..."
©1981 TIMOTHY TRUMAN
"...It would have come along with the deal!"
"But enough biological chit-chat, Romero. It's been a good game, but we really must be getting back to the *Hopkins*."
"Come along, Alamo...!"
END

Science for Science Fiction

Edited by John Boardman, Ph.D.

Why is the Sky Dark at Night?

Anyone looking at the night sky under reasonably good viewing conditions will be easily persuaded that there are a great many stars, randomly distributed through the sky. It is then quite reasonable to assume that the universe is filled with an effectively infinite number of stars, only a few of which are bright enough or close enough that we can see them.

The first person to find something wrong with this set of assumptions was Johann Kepler. The problem he posed is still very much with us today, more than 350 years later. If the stars are randomly distributed through the sky, and very large in number, then if you draw a straight line away from the earth in any direction, it will eventually, if prolonged far enough, reach the surface of a brightly shining star. Why, then, is the sky black at night?

Kepler used this argument to deny that the universe is infinite. Yet later in the 17th Century, the problem surfaced again – this time after Newton's discovery of the law of gravitation. The gravitational attraction of distant matter falls off as the square of the distance. But if the stars are randomly distributed, the amount of matter in the universe would increase with the square of the distance. Only by assuming a random, homogenous distribution of matter throughout the universe could this paradox be resolved. The distant gravitational forces all cancel out, and only the local ones (chiefly from the earth) would affect us.

The problem "Why is the sky dark at night?" was again undertaken by Jean-Philippe Loys de Cheseaux in 1744, and by Heinrich Olbers in 1823, after whom it is usually called "Olbers' Paradox." Both men assumed that light from the more distant stars was absorbed by interstellar matter. But when the laws of thermodynamics began to be understood, it was realized that this interstellar matter would absorb stellar radiation until it too heated up to stellar temperatures and began to radiate.

The resolution of this paradox can only occur if we abandon or modify the assumptions on which it is based. Kepler's solution, of a finite universe, is not supported by the observational evidence. It may be more promising to abandon the assumption of random distribution of stars. Stars are not randomly distributed, but are grouped together in galaxies. The galaxies, in turn, are grouped into larger accumulations. Our own galaxy, for instance, has two smaller galaxies in orbit around it. So does the Andromeda galaxy, a little larger than ours and at a distance of about 2 million light years. Our galaxy and the Andromeda galaxy, with their satellites and a few other, much smaller, nearby galaxies seem to form a system. But the systems of galaxies still seem to be randomly distributed.

One explanation lies in the general theory of relativity, proposed by Albert Einstein in 1916. One of the consequences of this theory is the expansion of the universe, a prediction soon supported by observational data. The further away a galaxy is, the faster it is receding from us, as a part of this universal expansion. Some galaxies, therefore, may be so far from us that their velocity of recession is faster than the velocity of light. The light from these galaxies is the light that is absent from the night sky, causing it to be dark.

So well established is the expanding universe that most astronomers failed to look further. Yet even without the universal expansion, an explanation can be found for the misnamed "Olbers' Paradox." Stars have finite lifetimes, ranging from a few million years for the largest and hottest ones, to many hundreds of billions for the faint, cool red dwarfs. If we look into great distances, we are also looking far back into time. We see the universe a billion light years away, as it existed a billion years ago. Further out towards the edges of the visible universe, we see regions in which stars have not yet evolved from interstellar matter, and so we do not see light from those regions.

This idea was first proposed, not by a professional astronomer, but by an amateur scientist, science-fiction writer and narcotics addict named Edgar Allen Poe, in his 1848 essay, *Eureka*. However, he did not himself accept this idea, and reverted to Kepler's explanation.

The Sciences, April 1981

The Return of the Unicorn

Recently this column cited a few of the facts on which the legend of the unicorn is based, but a real live yearling unicorn is *now* romping around Marine World in Redwood City, California. A scientific explanation for his presence ought to be forthcoming.

A scientific explanation *is* forthcoming, but it's the wrong one. The owners of the beast are Tim Zell, who now goes by the name "Otter G'Zell," and his wife Morning Glory. They have for many years been active figures in the present revival of ancient Paganism, and belong to a growing group which worships the Mother Goddess of antiquity and numerous other deities. ("Monotheism is religious imperialism," one Neo-Pagan writer has stated.) The G'Zells claim that the breeding of unicorns was practiced in ancient times, but that the knowledge was suppressed during the Dark Ages by the Roman Catholic Church. It is unclear why such suppression should have taken place, since thanks to shoddy translation from the Hebrew the unicorn is mentioned in the Latin Bible. A living symbol and representation of Christ would be useful to have around, since medieval pictures and tapestries depict the unicorn in this role.

The G'Zells claim that their unicorn, which they have named Lancelot, is a result of a breeding program whose details they refuse to make public. Dr. Perry Cupps, a professor of animal science at the University of California, claims that Lancelot is a freak of nature. Both claims ignore the fact that a bone symphisis exists down the middle of the forehead, and that horn buds could not develop in such a place – a fact pointed out a couple of centuries ago by the French naturalist Baron Cuvier.

Lancelot is obviously an ordinary Angora goat, whose horn buds were transplanted at an early age before they could take root in the skull. These buds were grafted on to the middle of his forehead, where they grew into a horn which is now 25 centimeters long. This practice has been known for at least 25 centuries. It is recorded that the ancient Athenian leader Pericles was once presented with a bull that had had this treatment. Such an animal was symbolic of leadership.

The surgery performed on Lancelot cannot alter his genetic make-up. If someone should bring a nanny goat to Marine World and get a genetic contribution from this "unicorn," the offspring would be pure-bred two-horned goats.

Besides, the G'Zells have used the wrong breed. The Unicorn Tapestries in the Metropolitan Museum of Art's collection show quite clearly that the model was not an Angora goat, but a Toggenberg.

New York *Post*, 5 May 1981; *The Lore of the Unicorn*, Odell Shepherd

What Do You Say to a Computer?

The biggest single task in dealing with a computer is to put your instructions for it into a form which the electronics can handle. The profession of programmer has arisen to meet this need, and numerous "languages" exist by which the questions asked by humans can be handled by the circuits.

The ideal situation would be a computer that could take spoken instructions in English, do its own conversion into its own language, and deliver its response the same way. This would eliminate the stage of "debugging," by which a program has to be examined for accuracy after it has been expressed in the computer's language and before it is run. Such a computer is now under development by David James and Scott Bambury of DJ-AI Systems. If their project reaches success, we will have a real-life version of the numerous talkative computers that have appeared in any number of science fiction stories and films.

If "debugging" is eliminated by this process, a similar operation will still be necessary in dealing with computers that can take oral instruction. The ability to express one's thoughts clearly and unambiguously is not really widespread. An even older variety of literature than the talking computer story can give us an idea of what to expect. Numerous folktales have the theme of a human being talking with, and giving orders to, intelligent non-human beings: demons, dwarfs, giants, and so forth. As the ancient tale of the sorcerer's apprentice tells us, anyone who gives such instructions to such a being in terms that admit ambiguity or misunderstanding is likely to get results very far from his intentions.

New Scientist, 29 January 1981

Facts for Fantasy

Edited by Susan Shwartz, Ph.D.

Class, Corn, and Oil

In Athens of the 6th Century BC, membership in the various social classes was based on the number of bushels of corn or measures of olive (olive oil, that is) that a man's estates could produce. Richest of all Athenians were the men who could produce from their land five hundred bushels a year. These people were called *pentakosiomedimnoi*, a name which relates directly to their five-hundred bushel income and was used for no other purpose. Other classes were defined by other bushel-measures: men who had three hundred bushels, two hundred, and less than two hundred. These men were called, respectively, *hippeis, zeugitai,* and *thetes*. Unlike the wealthiest men, the names for men of these classes are probably military in origin. The *hippeis* (from *hippos* = horse) were the cavalry and probably analogous to the Roman equestrian class, who ranked below the patricians but still had considerable status. The *zeugitai* were hoplites, or heavily armed infantry, while the *thetes*, which translates literally as "laborers," were essentially non-combatants. Scholars also interpret these three terms agriculturally. *Hippeis* who would thus become the men who own horses, *zeugitai* the men who own a yoke of oxen (independent farmers), and *thetes*, the laborers they would hire.

These classes were, essentially, consolidated by the law-giver Solon. Under his reorganization of Athenian law, the wealthiest men lost their monopoly on political office as the *zeugitai* (among whom, in the next century, Socrates would be numbered) gained the right to minor office. The *thetes* still could not hold office, but they were enfranchised. Their voice in the assembly was meaningful because of Solon's judicial reforms which allowed men to appeal judgments in the magistrates' courts to the assembly itself. Ultimately, however, in the fifth and fourth centuries, the *thetes* gained control of the assembly, possibly – according to Aristotle – because of the rise to prominence of the Athenian Navy, in which *thetes* were the principal rowers.

The Greek Tyrants, A. Andrews, Harper Torchbooks, 1963

The Thyrs

In the runic futhark, the sound "th" was represented by one rune. This rune had two names: "thorn" and "thyrs." It is thought by scholars that "thorn," as in bramble-bush and jaggers, was a later name and a euphemism; the earlier name "thyrs" was considered too fearful to use. A "thyrs" was thought to be a kind of monster. Beowulf, when speaking of Grendel, the creature who has depopulated Heorot for so many years, calls him a "thyrs." The word survived a long time in English country dialects in the form "thurse," which means goblin and in the word "thurse-hole," which is a hollow in a rock or hill where one might logically expect a thurse to live, in the way that Scandinavian trolls live under bridges. In Cumberland and Oxfordshire are places like Thirlspott ("thurse's pit") and Tusmore ("thurse's mere") which testified to local beliefs that monsters resided here.

Life in Anglo-Saxon England, R.I. Page, B.T. Batsford, 1970

Torngaks and Angakoks

For Eskimos all things are ruled by a multitude of invisible forces or beings, called *Innua*. Air, sea, earth, stones – all have their *Innua*. Some of these forces became guardians and helpers of men, and then the *Innua* becomes something like a *Torngak*. This name derives from the spirit whom the Eskimos called the Good Being, whose name is Torngasoak. Some people say he looks like a bear, some like a man with one arm, while still others say he is as small as a finger. Only the god Crepitus may slay him. While Torngasoak may be slain and did not create all things, he is still considered the great spirit of Eskimo mythology.

The *Torngaks* then are personalized manifestations of spirit who ally to a given man or men. Most powerful among such *Torngaks* are the spirits of stones and bears. If a bear-spirit becomes a man's *Torngak*, strange things happen. He may be eaten by a bear and then restored to life. This consumption by his personal totem-figure and his subsequent revival resembles the shamanic passage through the realm of the dead. People who make this transition are called *Angakoks*, or sorcerers. *Angakoks* can alter the weather, cure people, discover crimes, and prophesy. Because of their powers, they are a kind of judicial system. They are friends to *Torngaks* and under the protection of *Torngasoak*.

Larousse Encyclopedia of Mythology

Runes and Christianity

In pagan times, the runic alphabet was used only for inscriptions on stone, wood or metal. These inscriptions frequently indicated ownership, or gave the name of the man who had cut them for grave inscriptions and for magic. The earliest runic alphabet (called *futhark* from its first six sounds: f, u, th, a, r, k) consisted of twenty-four characters. But each of these sound-characters had a specific name and meaning just as Semitic letters and hieroglyphics had meaning in and of themselves. For this reason, individual runes or the entire futhark were sometimes engraved on things as a way of providing them magically with the *mana* or power of the letters themselves.

Unlike the Germanic language itself, the runes are not Indo-European in origin, but came into use long after the tribes moved west into Europe. Nor may they be derived from some common basis with the Old Irish Ogham, a hard-to-read cursive script which was also held to be magical. Possibly runes first came into use around 200 AD.

There were several varieties of runic alphabets, depending on the century and the country. The runes of 4th Century Gotland, in Sweden, were different, for example, from the runes of 8th Century England, to which four extra characters had been added to represent sounds found in Old English but not in very early Norse.

Runes were usually divided into three blocks of eight characters each. The Norse word used for this division was *aett*, which can either mean family or "eight." Because of their names, each *aett* may be said to include things of a specific character. The first *aett* includes runes named for things like property, oxen, a god, a demon, riding, torches, gifts, and joy. The second series is concerned with distress and the seasons: ice, hail, sun and so forth. The third series, which includes the rune that stands for Tiwaz (= Tyr, for whom Tueday is named), the one representing the god Ing, and runes for man, lake, horse, and others, may have religious overtones. The runes' names and arrangements into the *aett* are probably significant for purposes of conjury.

This may be seen in the Norse *Poetic Edda* in which the three Norns are described as sitting under the World Ash and cutting staves. These staves would have runic characters on them.

The runes, however, were transformed in the last quarter of the 4th Century AD. The missionary Wulfilas, attempting to translate the Bible into Gothic, found it necessary to create an alphabet to represent Gothic sounds. So he used both the Greek alphabet and several of the runic characters. What Wulfilas created then was a literary alphabet that was used strictly for communicating and not, as were pagan runes, for magic.

The Germanic People: Their Origin, Expansion, and Culture. Francis Owen, College and University Press, 1960

Oceanic Creation

From Nauru in the Gilbert Islands comes an intriguing creation story. In the beginning was only the sea. Above it soared the Old Spider, who found a giant clam, took it up and rapped on it; finding it hollow and empty-sounding, she opened it with a charm and slipped inside. It was so small she could not stand, nor could she see because the clam was dark – the sun and the moon did not exist. She hunted about until, at last, she found a snail. For three days she slept with it under her arm. The she freed it and found another, larger snail. At the end of the three days she asked it to open the clamshell wider so they could both sit down. When the snail complied, Old-Spider placed it in the west of the shell and made it the moon. By its light she saw a big worm. The worm too opened the shell wider. From it came a salted sweat which became the sea. Then the clamshell's upper half rose and became the sky. The worm, named Rigi, exhausted by his effort to lift it, died. Then Old-Spider took the other snail, made it into the sun, and placed it by the lower clamshell, which became the earth. And thus the world was made.

Film & Television

THE TIME BANDITS

Executive Producers: George Harrison & Denis O'Brien
Producer/Director: Terry Gilliam
Screenplay: Michael Palin
Editor: Julian Doyle
Songs: George Harrison

Cast

Sean Connery	King Agamemnon
John Cleese	Robin Hood
Michael Palin	Vincent
David Warner	Evil Genius
Ralph Richardson	The Supreme Being
Kenny Baker	Fidgit
Craig Warnock	Kevin

Bright-eyed, eleven year old Kevin retires for the night to his bedroom full of toys, leaving his fairly cold and indifferent parents downstairs. He makes his way to the bed through a jumble of scale-model soldiers, medieval warriors, spaceships, cowboys, and Lego blocks. Barely has he dozed off when through his wardrobe door bursts a full-size, armored knight on horseback. Joining forces, the pair leap forward through the next wall, which has transformed itself into an open meadow, and then disappear. A moment later, the wall and closet are restored, and Kevin is faced with the problem of whether or not he is dreaming. He is not.

Shortly thereafter, six demented dwarves emerge from the now undamaged wardrobe; they accost Kevin, demanding to know where the "hole" is. Kevin is caught up in a mad chase through the annals of history as The Supreme Being pursues the dwarves, demanding back what is His.

It seems the dwarves had lifted The Supreme Being's map of the Time Holes in the fabric of the universe (they remain unrepaired when He took a little time off at the end of the First Week, and somehow He overlooked them). Thus, Kevin gets to fulfill the dream of millions of the world's children by travelling through time to meet Robin Hood, Napoleon, and a half dozen other characters of legend.

There is obviously a strong hint of comedy in the plot of *Time Bandits*. With so many Monty Python alumni present, one might expect the typical Pythonesque humor, but such is not the case. Although the film is funny in many spots, it is, overall, a serious fantasy — a modern fairy tale on film aimed at the adult children of the television era. It has no moral hammerings, but there is a moral.

Time Bandits is a complex film. Its basic plot is one of good confronting evil, with the forces of good, of course, victorious in the end. It is, however, an unusual kind of victory: The Supreme Being defeats Evil with ease. There is no real contest, but there is a casual disregard for those brave souls who die at His hands.

Young Kevin is shown the world as it truly is: There is no justice, no logic to the universe — there is only random chance. A person cannot face the world passively; he or she needs intelligence, daring, nerve, and, most importantly, spirit.

Time Bandits, as you may have gathered, is not the most normal of films. Actually, it is difficult to pin down just what kind of film it is. Though it is often funny, it is not a comedy, nor is it serious enough to be a drama. Even though people die and the ending is a confused and, in some ways, sad one, it is not a tragedy. "I'm not really sure what *kind* of film it is," confessed producer/director Terry Gilliam. "I just want it to entertain and amaze everyone. I'd like them to come out asking, 'is it real — isn't it real — or doesn't it matter?'"

Gilliam has achieved his goal, although he may have done too good a job. People going to see *Time Bandits* with the preconception that it is a Monty Python movie may come out confused or disappointed. (A similar confusion happened with Gilliam's first film, *Jabberwocky*, which hurt it at the box office.) Despite the humorous moments, the film must be treated as a serious study of fantasy. Much of the story is somber, often touching, and demands to be taken seriously.

This is not to say that *Time Bandits* is free of problems. The script was created over one weekend, concentrated in only seven

(continued on page 27)

Books

Shadows of Sanctuary, Robert Lynn Asprin (ed.), Ace Books, $2.50
The Elves and the Otterskin, Elizabeth Boyer, Del Rey Books, $2.50
Lilith: A Snake in the Grass, Jack Chalker, Del Rey Books, $2.50
Tomorrow's Heritage, Juanita Coulson, Del Rey Books, $2.75
The Ring of Allaire, Susan Dexter, Del Rey Books, $2.50
Lord Darcy Investigates, Randall Garrett, Ace Books, $2.50
Long Shot for Rosinante, Alexis A. Gilliland, Del Rey Books, $2.25
The Janus Syndrome, Steven E. McDonald, Bantam Books, $2.50
The Great Rock n Roll Swindle, Michael Moorcock, Virgin Books, 1.50 Pounds
Reefs, Kevin O'Donnell, Jr., Berkley Books, $2.25
Spacetime Donuts, Rudy Rucker, Ace Books, $2.50
Starship and Haiku, Somtow Sucharitkul, Pocket Books, $2.50
The Seven Altars of Dusarra, Del Rey Books, $2.50
Last Communion, Nicholas Yermakov, Signet Books, $2.25

As an experiment this column, I will offer a modified format by presenting a number of considerably briefer reviews. I would like to hear your comments as to whether you prefer a few longer reviews or a number of shorter reviews per issue.

Somtow Sucharitkul, this year's John Campbell award winner, has recently published his first novel, *Starship and Haiku*. It takes place in a world decimated by biological and nuclear war, where neutral Japan is the only nation with any reasonable standard of living remaining. The Japanese, however, are busy killing themselves off in order to make a dignified and honorable exit from a planet where human life will shortly cease to exist. Sucharitkul's depiction of Japanese ethics is skillful, but not entirely convincing. A rather depressing book enlightened by good writing, it is more serious in tone and intent than Sucharitkul's short stories. Worth reading mostly because Sucharitkul is likely to become a more interesting writer as time goes on.

Rudy Rucker, author of *Spacetime Donuts,* has a doctorate in mathematical logic. The central concept in the novel deals with particles and their sizes. He equates the monad (the smallest indivisible particle) with the universe (the largest possible entity); in fact, there is only one particle (the universe) which is multiply-folded through n-space to produce what seems to be a very large number of particles that combine to form matter and the universe itself. It is an interesting idea, but not worth basing an entire novel upon, it would seem. The rest of the novel concerns itself with sex, drugs, and rock 'n' roll, combined with a particularly absurd (in a sense of silly rather than stimulating) sense of political dynamics. Not up to the caliber of Rucker's previous *White Light*.

Alexis Gilliland's *Long Shot for Rosinante* is a sequel to his *The Revolution from Rosinante*. Rosinante is a mundito (read "O'Neill colony") which, amid political unrest in the state of Texas which has financed its construction, eventually declares independence. Gilliland's strength is his ability to make sound convincing the conversation among humans and/or computers of same or different future cultures. For a novel which centers around political conflict, however, *Long Shot* seems sparse in its attempt to investigate political problems. *Long Shot* is a readable book, but does little more than recapitulate most of the themes stated in *Rosinante*.

Nicholas Yermakov, a relatively new writer, is the author of *Journey through Flesh*, which I praised some issues past. His new novel, *Last Communion,* is simply not as interesting as *Journey*. Both share a similar theme — in that they attempt to explore the effects of drastic alteration of human consciousness — the first novel dealing with (in essence) a drug, the current novel with the invasion of a human mind by an alien one. The major difference is that *Journey*'s characters are more fully fleshed and its society more detailed and believable. *Last Communion* is not a bad novel, but a disappointing one. Yermakov remains an author to keep an eye on.

Steven McDonald's *The Janus Syndrome* attempts to conceal its paucity of ideas, the silliness of its premise, and the triteness of its philosophy with lots of fast action. The writing is poor (and the number of grammatical errors I caught says nothing good about Bantam's proofreading staff). All in all, avoid.

Jack Chalker enjoys setting up an arbitrary set of rules and then seeing what sort of society would develop from these rules. He seems to have followed this concept in his *Well World* series and now does so again in his new series, *The Four Lords of the Diamond*. The first in this series, *Lilith: A Snake in the Grass,* is set on a world where material objects of any kind tend to get eaten by bacterium unless someone with pseudo-psychic powers stabilizes the object. (The psychic powers are actually a function of the powers of the omnipresent bacteria, but...well, read the book.) The somewhat thin plot superimposed on the book in order to rationalize the investigation of the world and its society centers on four men who have been imbued with the same personality and have been sent to the four worlds of the Diamond system with the objective of overthrowing their respective lords to expose an enemy alien presence (should one exist). The other three worlds of the system have rules different from those which operate on Lillith, and will, probably, be explored in the next three novels. Chalker's prose is stilted, but his ideas are exciting. Worth buying if you don't mind forced writing.

Juanita Coulson's *Tomorrow's Heritage* is a soap opera. Daddy, the famous scientist upon whose inventions the prosperity of the world is built, is dead. Mommy runs the huge industrial empire supported by those inventions. Eldest son is head of the anti-science political movement and heir apparent to the world government. Junior runs the biggest telecommunication company in the system, and sis is a spacefreak who has invested most of her savings in building an O'Neill colony at L-5. Naturally, there's a lot of tension in the family what with elections coming up, someone attempting to destroy L-5, and — whiz presto! — an alien probe entering the system. *Heritage* is more thriller than science fiction, but it's a pretty good thriller. Naturally, it's only "Book One of the Children of the Stars Series." *Tomorrow's Heritage* is good popcorn, but one expects more from Coulson. Also, it is increasingly disturbing to find that people who choose to write on political themes tend to have no discernible political opinions whatsoever, nary so much as a belief in democracy.

Reefs is the second book in Kevin O'Donnell, Jr.'s *Journeys of McGill Feighan*. McGill is a teleport employed by the world government to transport stuff to the stars. He also happens to have been swallowed and disgorged at birth by a snail-like alien working for the mysterious "Far Being Retzglaran." In his second book, McGill continues to be harassed by the Mafia as he jumps to the sea-world of Delurc to pursue the investigation of his strange heritage. O'Donnell is an entertaining and talented writer, though I fear the *Journeys* is not his best work. Too, in *Reefs* he turns McGill's teleportation ability into a veritable weapon of mass destruction, making McGill almost invulnerable to anything that might happen to him. How it will be possible to maintain any degree of suspense in future novels is an open question.

If you like a) Jerry Cornelius or b) the Sex Pistols, you might like Moorcock's *The Great Rock n Roll Swindle* in which the above mentioned two cooperate to bring anarchy to the UK. *Swindle* is written in the same disjointed style as all Cornelius novels and contains the same attitudes towards drugs and sex. The British audience may find Cornelius more understandable than I do. I prefer some of Moorcock's other writing. There are some amusing moments in *Swindle*, however, especially when Bakunin and the Ukrainian anarchist Makhno criticize the hedonistic decadence of what punkers claim is "anarchy." My review copy is a British export, but I imagine the novel will shortly be published in the US.

Shadows of Sanctuary is the third in Asprin's *Thieve's World* collection. For those of you who haven't heard, the collections are all set in the same city (Sanctuary), but each story is written by a different author. Writers are free to borrow each other's characters, so the result is a sort of multi-hero fantasy adventure — very reminiscent of fantasy role-playing (and has, indeed, been made into a game by Chaosium). In *Shadows*, Sanctuary becomes even more fully described; it is rapidly turning into one of the most depraved and violent cities in fantasy fiction. If you enjoy a dash of blood-encrusted evil with your heroic fantasy, *Shadows* will prove fun. There are fewer "names" in this collection than in the first two (though Cherryh and McIntyre make appearances for the first time), but the stories are of uniformly high quality.

Lawrence Watt-Evans was a noted fantasy role-playing GM before entering the real

world; his novels (of which *The Seven Altars of Dusarra* is the second) trace the adventures of Garth, a member of a species — the overmen — which Watt-Evans developed in his campaign. *Altars* is a set-piece quest adventure; Garth must find and despoil the altars of the seven temples of the city of Dusarra. Readable, but nothing special.

Lord Darcy Investigates is the newest collection of Randall Garrett's Lord Darcy series. Darcy is a gentleman detective living in an alternate universe in which magic supplanted science and where Richard Lionheart returned from the Holy Land to solidify England's conquest of France and establish a permanent Angevin Empire. The stories are mysteries (usually dealing with murder), the interest lying in the use of forensic magic to solve the crime. Personally, I find the Darcy series rather drab, but then I have never liked mysteries much. Those who enjoy the genre swear by Garrett, so my low opinion may be discounted.

Two fantasies — competently written, but with nothing new to say — are Elizabeth Boyer's *The Elves and the Otterskin* and Susan Dexter's *The Ring of Allaire*. In the former, an apprentice wizard's master is killed and the young lad must therefore fulfill his master's quest. In the latter, an apprentice wizard's master is killed and...you know the rest. In *Otterskin*, the apprentice must help a band of elves slay a dragon in order to get enough weregild to pay for the killing of the dwarven king's son — or there will be war between the elves and dwarves. In *Allaire*, the apprentice must free a princess imprisoned by the ice-lord eons ago in order to save the world from death by ice. Light entertainment. So, now what? *Greg Costikyan*

FILM & TELEVISION *(continued from page 21)*

pages. Taking his ideas to money-man Denis O'Brien, Gilliam did not merely present him with the script; "I performed the whole thing, and I must have done it well enough because he said I could have the money."

Money was not enough, however. Difficulties arose during the filming (which was started early to accomodate Sean Connery's schedule), many of them forcing script changes up until the end of shooting. Unfortunately, some of the forced changes — due to the cost involved or the sheer impossibility of doing some things — do not flow as well as they should. Some scenes appear to set up situations which are never resolved. Neither the Time Bandit's romp through recorded history, nor through the land of legend, are fully realized. Also, because the film has rapid shifts from comedy to seriousness, there are moments when the audience is a bit confused as to how it is supposed to react in certain scenes.

Despite the minor flaws, *Time Bandits* is still an excellent film. The moments of vague dissatisfaction are swept away by the movie's never-ending madness. As loose as some of the film's structure may be, it still hangs together nicely. Gilliam paid attention wherever necessary. Not relying on any of the "safe," popular conventions of the genre, Gilliam has made an enviable film. *Time Bandits* is the kind of movie audiences will recommend to their friends, and *that* is the best kind of movie of all. *Christopher John*

Media

The Fast Food Platter

True, unadulterated horror in the cinema has nothing to do with exploding heads or oozing gore in slow motion. True horror in the cinema is watching a 70mm print of *Outland* break, with nobody in the projection booth. Movie suspense is nothing compared with that generated as that ragged, 3-inch-wide hunk of film flaps inexorably toward the gate, leaving empty pulleys behind as it slithers through the governing mechanism of a film platter system.

The configurations of the system mean that the visual blast of a white screen for a full house at the Chinese Theatre is still minutes away. The projectionist is half a block away. Finally — *boom!* It only seemed like weeks before the show resumed...precisely where it broke off.

Staying alive as an exhibitor is the name of *this* game; the task being to diversify programming to draw more viewers, thereby compensating for the prohibitive cost of film rental — without dramatically boosting one's overhead. The question was how to run up to six different screens simultaneously, using one projectionist, and the fastest answer the industry could provide was the *platter system.*

Remember when so-called "multiplex" theatres began springing up out of nowhere; six big features under one roof? The whole amalgamation weighing in at the same capacity as a real theatre, thanks to portioned seating (the average, per house, for most is under 200) and those damnable postcard-sized screens? The platter system did not make them possible — they were inevitable — but it did make them *practical.*

Multiplexes make it by dealing in quantity, the drawing power of six movies over one. The strategem has been successful enough to drive "neighborhood theatres," those 1,000-plus seat cinema castles still standing in most cities, either to diversifying themselves (joining a theatre chain and eventually tacking-on a "Cinema II"), or to the slow death of Disney reissues. Multiplexes have more bidding strength; features are often distributed according to how many screens a company like Plitt or Mann Theatres is running in a given town. Of course, larger screens still do (and will) exist, but they've been co-opted already. For less than *Revenge of the Jedi,* one must seek out the literal confines of a multiplex.

To anyone who has ever seen a studio screening room, the multiplex house looks disturbingly familiar. *Looks,* because screening rooms, not intended for much aesthetic warmth, are more comfortable, have screens that can handle image sizes other than the standard aspect ratio of 1:85, and are sometimes even soundproofed against street noise, the clatter of the projector, and the din of the feature next door. Come to think of it, most multiplex houses resemble the sort of bare bones facility one might expect to find on Io, in the harsh atmosphere of *Outland's* Con-Am 27.

The key to the success of the multiplex is that it employs a little less than twice the staff for up to six times the business of a single-screen house. The principal Man in the Maze is the projectionist, slave to a staggered schedule, starting a new show every ten to fifteen minutes with — he hopes — the timing and luck needed for a Broadway musical.

Enter the platter system, the bridge between the manual projectionist and totally automated film-screening. Most motion pictures run five or six reels of 2,000 feet each (not to be confused with the old-style "reel" of 10-minute lengths). At first, each reel was mounted individually for screening, requiring two projectors and sharp timing between them. Then came the "tower" system, wherein all film material is spliced together on one gigantic reel, to play all the way through without changeovers.

The platter concept eliminates the reel and adds one more splice: The head of the film is connected to the tail, forming a closed loop which sits horizontally on a rotating plate some four feet across. The film pays out exactly like a mammoth 8-track tape cartridge, with tension, slack, and vertical feed provided by a dumbfoundingly complicated network of guides and pulleys. A film that is mounted on a platter system plays nonstop, continuously.

Unless the film breaks.

Since hundreds of feet of film are suspended in the works of the pulleys (not feeding directly through the film gate to a takeup reel), a break is a disaster. No new film is pulled off the platter while the old continues to feed; the distance is not equalized, and repair requires the film to be laboriously re-threaded, backward. If a break cleans the pulleys out completely — white screen — the best the audience can expect is a *long* cigarette break in the lobby.

Multiplexes arrange one platter per screen in long, overhead corridors through which the projectionist must scamper sequentially. The film is really monitored only at the beginning or end of the show; in-between, there are other machines to tend since the projectionist's time is employed as fully as possible. The viewer must pray that sound and focus are already correct, and that nothing (like a splice) throws the picture out of whack in midfilm.

As indicated, most major theatres now use platters. The prime liability of the system is the heavy wear it imposes on film; prints that would last 200 runs on a tower endure about 75 rigorous turns on a platter before falling apart. Combined with the substandard viewing facilities offered by most multiplex theatres, the viewer is sometimes as handicapped as the projectionist, in that neither can do efficiently what they're inside the theatre to do in the first place.

The crowd-processing nature of multiplexes and the automated aspect of platters suggest a sort of fast-food approach to moviegoing, one that is sometimes like McDonald's fare — easy to swallow, but hard to stomach. *David J. Schow*

Games

Edited by Steve List

Editor's Note

This game review column is now open for business under new management, namely me. The scope of the column is to try to cover all new fantasy and sf games as they are published. At the rate they are appearing these days, this calls for more reviewing than one person can handle and so there is plenty of opportunity for outside freelancers to get their material published. Any fantasy or science fiction game, including role-playing *games*, is appropriate (RPG adventures and supplements are handled by Gerry Klug). It will help if you send me a letter proposing a review subject before you actually send in a manuscript, so duplication of effort can be avoided (please include a return envelope).

In length, at least 500 words would be needed to minimally cover a game, and a major new product should be no longer than 1,800 words. As a review, certain information is required: name of game, designer, publisher and price. A listing and brief description of the components and an indication of their physical quality should be included as well as a description of the mechanics of play. The heart of the review, is, of course, the evalution: Is it any good? However, this must be more than a bald assertation. Reasons for liking or disliking a game should be spelled out. Reviews should also be written from as objective a viewpoint as can be achieved, i.e., the reasons should, as much as possible, be more than mere personal prejudices.

Any manuscript submitted *must* include a return postcard or self-addressed, stamped envelope so I can let you know if it is accepted or rejected (no card or letter, no publication, *period*). If you want a rejected manuscript back, please say so and include sufficient postage on the envelope. If you write me about a proposed review, I would appreciate a card or SASE to facilitate my reply to you. My address is 60 Spinythorn Rd, Levittown, Pa 19056. *Steve List*

Dwarfstar Games

Dwarfstar Games is a new line published by Heritage, USA. They are yet another mini-game format. The maps are typically 12" × 14"; the rulebooks 24 pages, but only 4" × 6" in size; and 154 counters. The maps and boxes are beautifully done paintings reproduced by four color process. In addition, the maps are heavy card stock, so except for wear at the folds they are more like mounted maps than paper ones. However, the counters are printed on stock hardly thicker than the maps, which could lead to durability problems. The boxes are one-piece end-opening affairs made of light card stock. While they are plenty roomy for the components (which include dice), they are none too strong. Dwarfstars will by necessity reside at the top of one's stack of games.

The first four titles in the line are evenly split between fantasy and science fiction. Of them, one is outstanding, one quite good and the others somewhat underwhelming. But priced at $3.95, they are not too much of an investment.

Barbarian Prince. Designed and developed by Arnold Hendrick, *Barbarian Prince* is a solitaire adventure-quest game. The player is in the role of a prince of the "Northlands Kingdom" on the run following his father's death in a palace coup. He has ten weeks in which to wander about the map and raise a purse of 500 gold pieces to finance his counter-coup. Failure to do this will give the usurpers time to impregnably secure themselves.

The map is a colorful display stuffed with mountains, deserts, swamps, forests, hills and cultivated areas in addition to prosaic clear terrain. It is cut by five rivers, dotted with several castles, towns, temples and ruins, and partially blessed by a sporadic road system. The other components are a single playing piece (an unpainted 25mm figure of the prince), 2 dice, two pages of charts and tables, a 24-page rules book, and the key element — a 48-page "events" book.

The player moves his piece across the map, and by rolling dice each time he enters a hex, he determines if an event takes place, using the various tables. The event may be beneficial or of no consequence, but all too often it involves a party of hostile soldiers, monsters, magicians, etc. In such cases, much dice rolling is usually needed to solve the event.

Characters have a combat skill and an endurance rating. Combat goes in rounds, with each character in the combat striking at a target. The combat skill of the defender is subtracted from that of the attacker and the result added to the roll of two dice, with further adds or subtracts due to the number of wounds each combatant has received. The final value is checked on a table to determine the number of wounds inflicted. When a character's wounds equal his endurance, he is dead.

Each game-turn represents one day. In that time the prince can attempt to move (one hex if on foot, up to 2 on horse, or up to 3 if on river raft or flying mount). The procedure is to roll two dice and compare this result to a numerical rating for the type of terrain being exited. If the roll is large enough, the moving character is lost and has to remain in the hex. In either case, another roll is made to see if an encounter takes place. In lieu of travelling, characters can stay in the hex to rest (recover from wounds), hunt for food or look for cached goods. In some types of terrain, other actions are allowed, such as seeking news, hiring followers, searching ruins or gaining an audience with the local big shot. These are all quite handy pursuits, especially hiring followers. While the prince is the best fighter in the game, he can usually be beaten by as few as two fighters of half his prowess, while the Troll should get him every time. While it is possible to run from a fight, success is not automatic, and in any event costs time. A retinue of expendable followers is handy to have, assuming one can afford to pay and feed them.

Aside from the random events, the look-it-up-in-a-book nature of the design (which is a matter of taste — some people enjoy this sort of thing more than others), the game offers few real problems. Some procedures could be less cumbersome. For instance, if the player wishes to cross a river other than at a bridge, he has to roll dice to see if he gets lost crossing. If so, he stays in his original hex. If he successfully crosses, he must roll to see if he gets lost in the new hex entered. If he does, he is considered to still be in the original hex but he *has* crossed the river. Since rivers run along hex sides, this makes for a rather boggling be-in-two-places-at-once situation. Combat can take a while, and given the potential length of the game (70 turns) one can get quickly bored with rolling dice and looking up events in a booklet.

"Play balance" is hard to judge. It appears to me that the prince has a hard time winning, often because he has too many fights before he can recruit some followers. I could be biased though, as I have yet to win. Certainly, the sheer number of events possible should keep the play from falling into patterns and thus always present a unique game. For those who enjoy solitaire games, as opposed to playing conventional games solitaire, it is worth a look.

Star Viking. Designed and developed by Arnold Hendrick. The Outrim Quadrant of the Orion Arm is on the very fringes of the decaying Federation. Beyond the fringe lies worlds once colonized by the Federation, but long out of touch. However, these presumed dead colonies have survived and developed a reasonably advanced technology. Withal, they do not have all they need or want, and propose to gain it by force from the Federation. Vikings once again voyage to loot more settled lands of their wealth.

The game pits one player (or two, in a three-player variant using components from two games) as the Vikings and the other as the harried military commander of the Outrim. The 154 playing pieces represent the ships, equipment and ground troops of the Vikings, the Federation and the local defense forces. There is no map per se; instead there are twelve 3½" × 4" map tiles, each representing a stellar system. The Federate player selects 9 or 10 of these for use in the game. He must tell the Viking player which he picks, but then allocates his forces to them out of the other's view. The Viking player must tell the Federate player how much he has to spend on his initial forces. Beyond that, neither knows for sure what his opponent possesses. However, the uncertainty is limited — the Federate player gets 3 each of the available Frigates and Escorts, and about 88% of the local available defense units. The Viking will have 61-66 "megacredits" to spend, or one powerful cruiser or two weaker sloops worth of warships. Each player knows in general, but not in detail, what he is up against.

The game is normally twelve turns long. Each turn consists of a Strategic Segment, one Tactical Action Segment for each star system containing hostile forces, and a Politics and Economics Segment. The Strategic Segment includes all interstellar travel. The Viking player moves his ships by placing them in a box in a hidden display, representing one of the systems or his home base. The Federate player moves his ships among the still-hidden tiles as he wishes, after which the

Viking reveals his location (if at a Federate controlled system). Likewise, the Federate player must announce if he has moved to a Viking controlled tile. If opposing forces are in the same system, the tile is placed where both can see it and a Tactical Segment commences. Movement in the Strategic Segment is unlimited except that Federate ships can never go to the Viking home base and units which "withdrew" from a system in the previous game-turn must go somewhere else.

The tiles each have the name of the star system, its technology level (A-D) and its wealth, i.e., the taxes it pays. Each system has one or more orbits, shown as an oblique dashed line, along which are arrayed "sectors." Each orbit has a deep-space sector — ships must stop in this when they enter an orbit — and a variable number of others. Some sectors (such as an asteroid belt) are by themselves, while others (a portion of a planet's surface) are in contact with neighbors (i,e., a planet consists of a group of sectors). Sectors may have a "wealth code" and certain bonuses or penalties in combat marked on them. One sector in each tile is marked as the system capital; possession of this sector during combat allows an invader to call on the defending forces to surrender, and possession at the end of a Tactical Segment determines political control and the ability of a player to tax.

The Tactical Segment procedes in a variable number of "rounds": One player moves, then combat is resolved in each sector containing opposing forces. The other player then moves, and again combat is resolved (at the end of a round the invading force could call for surrender and the Viking player plunder a sector he controls). All units are rated with Electronic Warfare (EW), Attack and Defense factors.

Combat consists of each unit shooting at one enemy unit. The target's defense factor is subtracted from the attacking factor to yield a differential which is then adjusted due to differences in EW, unit types and a few other considerations. Two dice are rolled on the appropriate column of the CRT to yield "no effect," "one hit" or a "Critical Hit." Some units are destroyed by a single hit, while some (large spaceships and powerful ground units) are "multi-hit units." These are destroyed by a Critical Hit or an accumulation of regular hits. Each hit reduces the attack, defense and EW factors by one; when defense reaches zero the unit is destroyed. Viking Cruisers and the lone Federate Battlecruiser can survive even a Critical Hit — though this leaves them vulnerable to destruction by another Critical Hit or four ordinary ones. The Tactical Segment usually continues until one side is annihilated or has withdrawn, but it can end with both sides still present by mutual agreement or if four rounds go by with no fighting.

Once all Tactical Segments have been resolved, the Politics and Economics Segment takes place. First, the Federate player rolls 2 dice and consults a list of possible events to see what fate decrees (it usually costs him ships or money). He then has the option of rolling to see if he can build the Battlecruiser or new Frigates or get special economic aid. Following this, he can tax all the systems he controls. No more than half the taxes can be spent on Federate units. The rest may be spent on local defense forces in the system where the taxes were raised. Federate taxes can be accumulated, but unspent local revenues are lost (since the local defense units will all have been built early in the game, in effect the Federate player loses the use of half his taxes). The Viking player can tax his home base and any system he controls (if he did not just plunder them) and plunder sectors not yet ravaged in the turn.

The funds raised are spent to build new units or repair hits on existing ones (with the Federate player limited by tech level as to what he can build in a system) and to purchase Victory Points. The Federate player must spend 4 times as much for each Victory Point as the Viking, which allows the Viking to buy enough to avoid an automatic victory in the early part of the game, but not necessarily enough to win. Victory is by the most points after twelve turns, having a 2-1 lead in points for two turns after turn 7, or by the Viking player gaining control of the Federate Quadrant Capitol Sector (which he can locate only be exploring systems).

These are a lot of rules to pack into 24 pages and two charts, but they are well done. A trivial bug here and there shows where finishing touches were missed, but all in all they are complete and lucid. Beyond that, they are good. *Star Viking* as a game approaches *Imperium* (to which it bears a resemblance) in excellence as a game of strategic space opera.

Outpost Gamma. Designed by Howard Barasch. On the mining colony world of Irda, Twarg colonists have by various means sufficiently annoyed the native laborers that they have begun to protest. Since the protests have taken the form of massacring the Twargs, Imperial Legionnaires have been sent to pacify the planet. These tough troopers, with powered armor and energy weapons, found the mix of traditional and stolen weapons used by the Irdans to be sufficiently deadly to make the job something less than the walkover they had expected.

The 12" × 14" map covers (on an unspecified scale) some typical Irdan terrain. The center is dominated by two plateaus, each surmounted by several mesas, with 5 more intruding across the map edges. In the eastern quarter of the map, running irregularly from north to south is a dry canal bed which serves as a highway. Scattered about the low areas are numerous craters and vapor pools. The combat forces include 10 Legionnaires (one man per counter), 6 colonists (5 Twargs each) and 115 Irdan Rebels (likewise 5 each except for two leader units). Also included are disruption markers, improved position and fortification markers and "energy storm" counters.

The sequence of play first determines if a new energy storm is placed on the map, and then the size and direction of movement of existing ones that turn (storms block lines of fire and reduce Legionnaire combat and movement abilities). Each Legionnaire counter can then place a disruption marker (representing stun grenades) which has a 50% chance of stunning all units which begin in or enter the hex. Then Irdan units move and engage in combat, after which Irdans stunned in combat the previous turn recover. The Imperial units move and attack, followed by recovery of grenade-stunned Irdans and Imperials stunned that turn.

Units can attack with fire or close combat. In practice, both forms are identical for range, and in fact, can be combined. The total attacking factors are added together, with the total defense factors in the target hex subtracted to yield a differential. The die roll for results can be modified up or down by terrain effects, and results (no effect, stun and elimination) affect only the defenders. Stunned units cannot move or attack, and defend at half strength.

The combat procedure is a bit distorted as it makes units less vulnerable to fire by packing them into the hex, while defensive terrain benefits are peculiar. Units in a canal hex cannot be fired on through a canal hexside, even by adjacent units. Nor does occupying a mesa top aid in defense (though it gives a bonus to attackers in close combat).

The game contains two scenarios. In "The Last Outpost," ten Legionnaires must hold at least three mesa top hexes for twelve turns or else destroy *all* Irdans. Since all 115 Irdan units come into play, this one could be subtitled "Custer Had it Easy." The raw total combat factors are 66-30 vs. 324-382, so despite the fortifications available to the defenders, it is not difficult to guess who will usually win. Scenario 2, "Evacuation," gives 7 Legionnaires fifteen turns to get at least 3 of 6 Twarg units from the north edge of the board to the south, with a mere 30 Irdans to bar the way. Since it takes the pokey Twargs twelve turns just to cover the distance, little leeway is allowed.

The best thing I can say about *OPG* is that the map, painted by David Helber, is excellent. As a game, the mechanics are not appropriate to the scale of action and the scenarios are neither balanced nor imaginative. Despite its billing as a "game of man to man combat," it is not and its system is not one which admits (or encourages) developing home-brew scenarios as does *Star Soldier. Outpost Gamma* is not worth a visit.

Demonlord. Designed and developed by Arnold Hendrick. *Demonlord* is a strategic game (with a quasi-tactical combat resolution procedure) about a war between the Nisshar province of a Demon empire and human/semi-human alliance devoted to the light-god Hosar. In the territory between them lie five small neutral states of various races which can be recruited into alliance with either side.

Units in the game are either characters or troops. Troop units have a movement mode (foot, cavalry or winged), armor type (heavy, medium or none) and four numerical ratings: missile, melee, morale and movement. Characters have a movement mode and rating, a magic power and range (either or both can be zero) and possibly an army leadership ability. Movement costs are governed by the terrain type of the hexside crossed and may vary with movement mode. Units beginning a movement phase not stacked with a character with army leadership can move only half their movement factor.

Magic is mercifully limited and not too powerful. There is Battle Magic (which gives the user a form of missile fire), Siege Magic (which modifies die rolls in siege combat), Invocation Magic (used for summoning help from spirits or demi-gods), Alliance Magic (for recruiting neutrals) and Special Magic. The non-Special magics are successfully used if the casting character manages to roll equal to or less than his magic power, and except for Battle and Invocation Magic, can be cast at any hex in the range of the caster. Special magics are rated by the minimum power needed by a character to use it, with the tougher spells requiring a higher die roll for success. Both sides have seven possible spells, but no more than 5 can be used in any one game. Both sides can use Vision (allows inspection of an enemy stack), Cloak (which cancels Vision), Force March, and Earthpit (a form of movement interdiction). The Demons can cast Darkness (reduces enemy morale) and Necromon (bring dead units back to life) while Hosar has Light (reduces enemy morale — Light and Darkness cancel each other) and Rains (useful for flooding areas to deny access).

The game provides for an indefinite number of turns until any of various victory conditions are achieved. A game-turn contains two identical player phases in which the actions are: 1) Unit Movement; 2) Invocation, 3) Battles, 4) Sieges, and 5) Alliances. A character can cast a spell at any time (though some spells can be cast only at certain times), but each character can only cast one spell per phase.

Combat is resolved in a semi-tactical manner. It takes place whenever troops of the phasing player enter a hex containing hostile units. If more than one type of terrain is in a hex, the defender determines in what type the battle takes place. This will determine the "battle size" and possibly degrade the performance of some unit types. A battle line is set up in some convenient spot, each player alternately placing a unit until there are as many pairs of units as the battle size. Extra units are held in reserve (if a player has fewer units than allowed, the other can gang up on him so long as he has no more units on line than the size allows). Characters are then stacked with the troop units in a similar manner, and combat proceeds in rounds until one side is eliminated or withdraws.

Each round consists first of missile fire, then melee. To resolve either, the attacking unit must roll its appropriate factor or less on two dice to achieve a "hit" (rolls can be modified for armor or terrain). If a unit is hit, it must check morale. A roll (presumably one die, but the rules do not say) of less than the morale factor is a pass, while one greater means the unit is eliminated. If the roll equals the morale factor, the unit routs. Routed units are out of play, but the winner gets his back after the battle is over. Losing routed units are captured (and can be traded between players).

Sieges take place if a party in a battle hex decides to stay inside a city or castle. Each player-phase a siege action is undertaken, with both sides rolling dice to inflict casualties or force a surrender.

Demonlord is not an overwhelming game, but it is well put together and plays nicely. It naturally shares some ideas with other fantasy army games, but has many original elements that distinguish it; it is well worth looking into. *Steve List*

Champions

Design: George MacDonald and Steve Peterson
Components: 64-page softcover booklet
Hero Games, $9.95

In the never-never land of superhero comics, good is ultimately triumphant over evil, the great cities of the world are destroyed and rebuilt on the average of once a week, and our two-dimensional heroes futilely struggle to become three-dimensional. Upwards of a million readers a month gladly enter this surreal, though simpler, world to follow the latest exploits of their favorite protagonists. It requires no great inspiration or leap of faith to see why this makes excellent grist for a role-playing game: Any fan not dependent on the prop of genre art can vicariously enjoy the adventures which have so captured his imagination.

The design of *Champions* is as sketchy as the typical plot of a comic strip and yet, in many ways, it is sufficient. The game is little more than a character generation and a combat system sandwiched by suggestions for appropriate role-play and for background construction. What enables the designers to get away with this minimalist approach is an unswerving devotion to the philosophy and to the spirit of the superhero comic, which itself has never pretended to be terribly complex.

The superior feature of the game is definitely the character generation system. A player plots his character's strengths, to which he can add limitations, and then partially compensates for these improvements with assorted weaknesses. The rules constantly remind the player to think of his developing character within the context of the comic book genre; the character sheet, for instance, includes a basic body sketch over which the character's costume can be drawn.

The player begins with a purportedly average human being and 100 Power Points. These points are used to increase characteristics, and to purchase skills and powers. A character can gain additional points by reducing his characteristics or by taking disadvantages. There are limitations on all this trading-off, mainly to guard against those jokers who insist on including every possible feature — whether good or bad — for a character to aggravate the gamesmaster.

The primary characteristics, from which the figured characteristics are derived, are a fairly standard lot. The only unorthodox appearances in the former batch are by Ego, which no self-respecting superbeing should be without, and by Presence, which represents the character's ability to awe merer mortals. The figured characteristics are indices, governing defensive capabilities, ability to take and recover from punishment, and quickness. As this last, Speed, controls precedence within the combat turn and the number of actions a character can undertake during a turn, it is easily the most important.

The check that limits the players from concentrating exclusively on increasing the best characteristics is a pro-rated cost for attempting to do so. Therefore, Comeliness — continuing a grand tradition in role-playing games of downgrading physical attractiveness — is cheap to boost, and conversely yields the meagerest return when lowered. The costs to vary the characteristics are unusually well-balanced, which allows for great variety in characters. This has to be the result of extensive playtesting, which many larger companies seem to think is the responsibility of the consuming public.

The rules deftly describe what these different characteristics do and mean. When told that "it may be disturbing for a character to fly in from a great distance, wow the crowd with his mega-blast, and then be cut down by a small child with a thrown rock," a player immediately grasps the value of a good Defense. The designers occasionally wander astray with wargaming jargon, and do not always explain the full ramifications of the stray rule, but, overall, they do a nice job of explaining their game to the reader. (I tend to use a less rigid standard when measuring the worth of role-playing as opposed to boardgame rules, as the former is a far more open-ended exercise.)

The quintessential superhero would be at a loss if he had to operate with only those skills he could find in the pages of *Champi-*

ons. The urban environment in which characters inevitably will operate requires a Renaissance superman; unless the gamesmaster is one of those who will always test a weakness of the characters each adventure. ("The Red Menace has trapped you in a vault with ten-foot thick titanium walls. Deadly nerve gas is pouring in through the only vent. Too bad you know nothing about lock mechanisms or architecture!") The skills presented are a sturdy lot, though Luck would appear to fit into the Power category.

Hero Games' first adventure for ***Champions*** *— The Island of Dr. Destroyer.*

The Powers, if not up to the impressive standards set by *Villains and Vigilantes,* are a good collection. The designers have culled their (presumably) excellent library of comic books to include the abilities used by our favorites. A Power can be acquired at one of several levels (cost escalates as the effects become better); for instance, Life Support ranges from the ability to breathe underwater to being able to survive everything short of physical damage. There is also Multi-power, an economy package. The character "slots" several Powers into one, which prevents him from using all of them at once (though he can switch freely from one to the others between turns). A Power can be augmented with advantages, such as affecting desolidified objects. (We have never acknowledged the debt we owe the comics for expanding our vocabulary.) If the player is running short of Power Points, he can replenish his supply with limitations — such as a fixed number of uses per day — upon his character's Powers.

The disadvantages are classics as a design device and as a reflection of the peculiar problems one can only have as a comic book character. There is the helpless dependent who is constantly falling into the clutches of villains, despite those villains being unaware of the superhero's other disadvantage, his secret identity. A superhero could be susceptible to certain substances (which just might be fragments of his home planet), hunted by a government agency or other superbeings, or have psychological impediments against going about his business ("I never kill!"). These disadvantages are graded like Powers; the combination encourages some truly individualistic characters. Those wily players who bend the rules to their every advantage have once again been anticipated by playtesting: When a "disadvantage" becomes a benefit (e.g., a character goes berserk only in unusual circumstances which he can artificially cause), it costs Power Points.

The combat system is more conventional, owing to its miniatures antecedents. The rules retain the annoying habit of measuring all distances in inches (equivalent, in this instance, to two meters), which makes visualization for paper-and-pencil players that much harder. The combat procedure is notable for its smoothness in play. The attacker's turn is figured from his Speed; he rolls for his attack values, which are subtracted from the defender's defense values, and the remainder is applied to the defender's Stun and Endurance values. It may be unspectacular, but it has the undeniable virtue of getting melees resolved in an efficient manner.

Several pieces of window dressing make the combat system distinguishable as one for a superhero role-playing game. First is the selection of combat maneuvers, ranging from the cowardly Dodge to the brutish Haymaker. Second is the amazing recovery rate of the characters, and their abilty to exceed their "normal" capabilities by "pushing" their Endurance. The last is Knockback, wherein the defender, if smashed hard enough, will fly helplessly through the air (and can be further damaged if he impacts against a solid object). Roughly the same procedures are used for an Ego attack.

The text begins to peter out at this point. The designers display a few more flashes of their marvellous sense for the comics by describing the motivations of supervillains ("Destroying the world: If you can't conquer it, blow it up.") and admonishing players that their characters are only as good as their last soliloquy. And they do break new ground in designer's notes, by fearlessly admitting the game design began as a refuge from boredom during a college lecture. However, they also manage to waste five to ten pages with character examples when they could have provided instructions on how to play the game. Because of *Champions'* sparseness of presentation, it will assume an irregular, episodic quality with all but the most highly inventive and imaginative gamesmasters. The material here is not enough to maintain, let alone sustain, a campaign.

The cover is a nice imitation of the styles favored by Marvel and DC, as are the interior line illustrations. The text is typewritten and justified, which is not unpleasant to the eye. The character sheet is well-organized, especially so for a first published version (nothing evolves as rapidly as a role-playing character sheet).

Designers MacDonald and Peterson are to be commended for designing a worthwhile game which embraces two of my pet peeves: an emphasis on combat and an incomplete design. They happen to have chosen one genre in which this is acceptable and perhaps even expected. But how could they not include a single "Wham!" or "Ka-pow!"?

Eric Goldberg

RP Gaming

Edited by Gerry Klug

The Dwellers of the Forbidden City

Advanced Dungeons and Dragons Module I1

Design: David Cook
Development: Harold Johnson, Lawrence Schick
Art: James Holloway, Jim Roslof, Erol Otus, Harry Quinn & Stephen D. Sullivan
Components: One 28-page booklet, 7 maps
TSR Hobbies, Inc., $5.50

There was a time, not too long ago, when I looked forward to the release of a new *AD&D* module from TSR with something akin to the anticipation of a kid at Christmas. I was DM'ing a campaign which met two or three times a week, and I desperately needed adventures with which to challenge my players and give my tired brain a respite. Unfortunately, at that time, the modules came about as often as Christmas actually does, so there never seemed to be a new one when I needed it. The quality of these modules more than made up for the lack of quantity, and this was in no small measure due to the author of the majority at that time, E. Gary Gygax. His imagination knew no bounds it seemed, and his dungeons were coherent, playable, and interesting without stretching disbelief too far. They even made sense, which for an *AD&D* adventure was going some.

Those halcyon days are gone.

Now, it seems, while TSR is able to produce many more modules than it used to, it lacks the imagination to produce modules of quality. Take *Dwellers of the Forbidden City,* for instance...no,don't, you will be wasting your hard-earned money.

This module is ill-conceived, disorganized and, in some places, so ridiculous as to make me think TSR has lost editorial control over their product. The basic premise is that somewhere in the jungle a group of marauding nasties are going around messing up trade and commerce (not to mention some poor innocent victims). These nasties are apparently coming from an area in which there is rumored to be a long lost, forgotten city. Your mission, if you decide to accept it (you'd better or there'd be no adventure...), is to go and find this city and clean out the nasties (of which the population, by my count, exceeds 300 beings, plus a *dragon*). There are some other adventure ideas presented to get the characters into the city — some less inane than the one cited above — and they are listed at the end of the booklet. What they are doing there, appearing almost as an afterthought, is beyond me. It would seem that the adventure ideas should be presented at the beginning of the booklet, so as to appear related to the rest of the text.

The city itself is set in a valley totally surrounded by a very steep cliff, which is only traversable in a few choice places. Each entrance is designed such that there is no advantageous way for the party to enter; they'll

get jumped and beaten up no matter which they choose. The map of the city, which is presented on the inside cover, is a valiant attempt at a forced-perspective rendering of the city as it might appear from one cliff edge. The map looks good, except that it is sometimes difficult to make out important details such as whether a structure is a ruin or a perfectly good building. Also, some encounter areas are hard to find because the letter code occasionally blends in with the background.

The city residents include three separate groups, all intelligent or at least communicative, among whom a pecking order has been established. They all co-exist in a one square mile area without any apparent food source (maybe that is why they pillage and rape). All these inhabitants are members of races new to the *D&D* menagerie, and all are very interesting. They will make worthwhile additions to any campaign. What is implausible is the way in which they co-exist. A good DM would have to work diligently to get this society to the point where any intelligent players would believe it is as thriving as the module seems to imply it is. Herein lies my major complaint — the amount of time needed to flesh out the adventure and have it make sense would take almost as much time as creating the city from scratch.

Outside of a few glitches with the maps (no scale on one, misreferencing, text not matching the map on another) and the fact that there is no real guidelines as to how the inhabitants will react to the party (the implication is they will kill, kill, kill), the module is well laid out and informative. It seems TSR has abandoned the idea of separating the information for the player from the information for the DM when listing room contents. They should go back to the previous method, since each room must be edited by the user to separate the information into a usable format.

TSR has set a standard in the FRP-ing community which the rest try to keep up with. If *Dwellers of the Forbidden City* is any indication of what is coming, they may not live up to their own standards. E. Gary Gygax, where are you? *Gerry Klug*

The Secret of Bone Hill
Dungeons & Dragons Module L1

Design: Lenard Lakofka
Art: David S. Laforce, Erol Otus, Harry Quinn, Jim Roslof, Stephen D. Sullivan & Bill Willingham
Components: One 28-page booklet, 8 maps
TSR Hobbies, Inc., $5.50

There's good news and bad news.

The good news is that TSR is publishing a new module for low level characters. The bad news is that it might require a more experienced DM to overcome its omissions and shotgun method of presenting information.

On its good side, the module is a valuable aid to the relatively new DM whose campaign has reached the point where he needs to give the players' characters a home base. The Town of Restenford described in the module is a functional haven which includes well-described adventures, storekeepers, and population.

The adventure to Bone Hill, while it holds no surprises, will be a challenge for the player/adventurer beginning to feel cocky and invulnerable. The module also contains a mini-mini-adventure of sorts for the players to handle in town.

The problems come in when the DM and the players consider their motives for attacking Bone Hill. I suppose the players could go for the sake of adventure or because the DM says "Go here this week." But the module promises to be the first of a Campaign Series and the DM must keep the players at bay with stipulations about waiting for the next module in the series.

The immediately usable portion of the module is the trek into the castle ruins on Bone Hill, which is anti-climactic at best. Once the adventure is over and the ruins and caverns cleaned out, the only thing to do is go back to town. No secret treasure maps. No cryptic poems. No sudden teleportation into another dungeon.

At least with the TSR Giant Series (G-1-2 -3), the players found scrolls or caves that led to new and greater adventures. Here there is no *deus ex machina*. It is as if this module were designed to introduce the town, with a side adventure simply thrown in.

The DM without a medium amount of experience in deciphering map locations and room descriptions would be well advised to read through the text several times as there are a few secret doors, altars, and furniture missing from the maps and at least one stair reversed. Also the scale of Restenford Castle may have to be increased according to taste (a lavishly appointed bedroom measuring 5' × 10'?).

The Secret of Bone Hill's maps are most useful when they depict the town and the surrounding country. I am puzzled, however, over their choice of buildings to be mapped in town. Maps for the three inns/taverns are provided, but a dungeon complex rich enough to attract any greedy group is skimmed over and the map left up to the DM.

For DM's planning to pick up this module, I suggest reading the introduction, skipping ahead to the description of the town, and *then* returning to the description of the castle ruins. Otherwise, some references to Barons, Clerics, and rumors can become confusing. For the illogical presentation of the information, the module requires extra readings.

The new creatures presented are interesting, but not innovative and present no thinking challenge. The module is designed for character levels 2-4, supposedly. This reduces the encounters with strange creatures to hack-and-slash as the spells to destroy the monsters are well beyond the characters' limits.

DM's who can recognize the many situations which require rounding out in the adventure probably have developed their campaigns past the need for a simple adventure. Newer DM's will have to be careful to cover all contingencies. Either group, though, will probably wait for the next module in the series to determine its direction and applicability to their campaigns.

Maybe that's the secret of Bone Hill.
Robert Kern.

Software

Edited by Ian Chadwick

Robot Attack
Big Five Software

Arcade style game, 1 or 2 players; no interaction, machine language, sound effects
Graphics: **A**; Playability: **B**; Enjoyment: **A**
TRS-80™ MOD I & III on same disk or cassette

Robot is the long-awaited, latest offering from the creators of some of the best arcade games for the TRS-80 (see reviews of *Attack Force, Super Nova* and *Galaxy Invasion* in *MOVES* 57). It opens with a hauntingly familiar line: "Long ago, in a galaxy far, far away"...I would have thought *that* would be copyrighted. However, *Robot* is based on the arcade game *Berzerk;* the player moves a stick-man figure through a simple maze, attempting to shoot as many enemy robots as possible. Each robot destroyed is worth 50 points and a bonus is granted for each level cleared, provided the player manages to move his/her character off the screen through one of the exits. The mazes, while not being challenging for anything above the level of planarian worm, provide many difficult to reach corners and even, on one occasion, a sealed room in the center of the screen with a robot inside (no bonus...unfair!). Simple enough, except that each "wave" of robots is more aggressive than the last and later waves even shoot back! To make matters worse, an enemy flagship enters to chase the character and it not only moves through the walls of the maze but cannot be destroyed by the player. Its touch is instant destruction.

There are some twists here: If either the player or the enemy robots touch the walls of the maze they are destroyed. Since the robots move in response to the character (and they're not terribly bright), they can be faked into blundering into the walls...and they count for points even so! Computer owners might recognize this as a customized version of a BASIC game from way back (a listing of the original is available in David Ahl's *Basic Computer Games*). Four characters are the player's arsenal in the beginning and extras come with each 5000 points.

Big Five isn't content to make such a straightforward game, however. They have included not only their usual graphic delights but a new twist: a talking computer! Not just sound effects, but real vocalization! The game announces itself by actually saying "robot attack" and it has a number of cute phrases you will discover as you play. This is a new and unique technique (watch: It'll be copied by everybody very soon...). I won't spoil your pleasure by revealing all the surprises that await you.

Somewhat disappointingly, there is a small but annoying flaw in the control of the figurine: it is slow to respond using the arrow keys (joystick control may improve this; it is available for this game by the way). The char-

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acter can only fire directly down from the right side which is awkward and often forces the player to dance around trying to get set up for a shot. It is not enough to make the game unplayable. It is difficult to score high in this game, so it offers a real challenge; at the time of this writing my high score was 5830 after three days of play. And levels only get harder to clear.

Robot Attack is highly recommended for the nimble fingered arcade buff and even more so for the curious programmer who wishes to discover the secrets behind the unusual technique of voice replication used here. Another feather in the cap of Big Five.

Master Trader
Argon Games

SF game, 2 to 12 players, little interaction, no graphics (text only)
Playability: **B**; Accuracy: **C**; Enjoyment: **C**
BASIC/TRS-80 and Apple™ II disk versions on same disk

Trader is a disk version of a game that appeared originally in a book called *What to Do after You Hit Return*. It's an easy game to play, but rather long. Luckily, it can be saved to disk during play for continuation at a later point. Essentially, players move about a universe buying and selling products to try and make the highest return from the deals. There are four classes of planets from 1 and 2 (cosmopolitan and developed: product producers in search of raw material) to 3 and 4 (undeveloped and frontier: raw material producers in need of finished goods), and prices paid for and asked for goods vary according to class. Also, demand for a particular item varies with class and how recently any player has been trading that product there.

The stellar map is set according to the number of players involved and distances vary with each game. Each year the demand, prices and availabilities are reset and planet classes may change during the game. The game lasts five years but game parameters may be changed to allow no limit. Other parameters are maximum cargo tonnage (30 tons), profit margin average and bidding rounds. You may be able to bargain for a better deal although a greedy player will quickly find he or she is closed out of bargaining with nothing to show for it. At certain planets, players may conduct banking procedures. A small bit of chrome allows players to name their own ships.

Though a deceptively simple game, a lot of thought has gone into the design. The econometric model may not be accurate, but it is self-sustaining in game terms. Although easy to play, each turn takes rather long to play and there is no real action in the game outside of the buying and selling at various planets. The only random events are the odds delays in either taking off or landing (some are rather humorous). A few odds and ends such as pirates or disasters would be interesting. The only effect other players have on each other has to do with the trading — it would have been nice to allow players a bit more active interaction such as trading between players both on the same planet or allowing players to bid competitively if on the same planet. One small surprise is the appearance of a new star system in the middle of the game.

Trader is not a bad game, just not terribly exciting. Broderbund's *Galactic Trader* may be a better game (especially visually) but it is only solitaire play. *Cosmic Trader* (see review this issue) has a lot of nice twists in it and it plays moderately well, but the trading is too limited to offer an accurate simulation. None of these games offer a terribly accurate model of trade and commerce and all are too simplified although some fun may be had in playing them. It appears that the ultimate stellar trading simulaton is still to be written.

Cosmic Trader
Simulation Software

SF merchant game, 1 to 4 players, no interaction
Graphics: **E**; Playability: **D**; Accuracy: **D**; Enjoyment: **C**
TRS-80 MOD I cassette

Trader is another game where the player(s) attempt to become rich by the tried and true means of buying low and selling high. Not critically different from any of the other trading games, this one is perhaps the weakest of the lot. Each player's ship has three cargo holds which can carry one of the ten types of cargo available: weapons, food, textiles, liquor, medicine and others. An option available at the beginning of the game allows a player to transform only one pod into a laser weapon to battle with potential pirates. It also decreases cargo capacity by one third. Players may also decide the length of the game at the onset of play.

Each turn, players enact one purchase and one sale (if possible) on a planet. Some haggling is required. For some reason, only one of each type of transaction is possible per turn, even if the planet would buy more than one cargo or if the player has available space for more than one cargo. The screen display shows current cash, fuel and cargo. Fuel may be bought at varying prices after other transactions.

The next location is chosen from a ridiculously simple star map and the fuel cost shown only after a destination is chosen. During the journey some random events, such as meteor storms or pirates, add pleasant chrome to the game; otherwise, the game is pretty lifeless and boringly simple. The winner is simply the player with more cash at the end of the specified number of turns. Not much fun, but the younger set might enjoy it (12 or younger). It aches for added complexity and improved graphics.

Ian Chadwick

Feedback

Reader Survey, Ares nr. 12

Your opinions directly affect the editorial content of *Ares* Magazine. We invite you to participate in this, our regular survey of readers.

How to use the Feedback Response Card: After you've finished reading this issue of *Ares*, please read the Feedback questions below, and give us your answers by writing the answer-numbers on the card in the response boxes which correspond to each question number. See enclosures for card. Please be sure to answer all questions (but do not write anything in the box for question-numbers labelled "no question"). Incompletely filled-out cards cannot be processed.

What the numbers mean: When answering questions, "0" always means NO OPINION or NOT APPLICABLE. When the question is a "yes or no" question, "1" means YES and "2" means NO. When the question is a rating question, "1" is the WORST rating, "9" is the BEST rating, "5" is an AVERAGE rating, and all numbers in between express various shades of approval or disapproval.

1-3. No question

The following questions ask you to rate the articles in this issue on a scale of 1 (poor) through 9 (excellent); 0 = no opinion.

4. Star Trader (game)
5. Star Trader (illustrated story)
6. Eleven Billion Dollar Bottle of Wine
7. New Minds
8. Adventures in Albion
9. Science for Science Fiction
10. Facts for Fantasy
11. DragonNotes
12. Universe Commlink
13. Designer's Notes
14. Media
15. Games (review)
16. Software (review)
17. RP Gaming (review)
18. Film & TV (review)
19. Books (review)
20. Issue cover
21. This issue overall

22. Is this issue better than the last one? 1 = Yes; 2 = No.

23. Did you send in the feedback card for your last issue of *Ares*? 1 = Yes; 2 = No.

24. Assume that you don't subscribe to *Ares*. Would the quality of this issue alone motivate you to subscribe? 1 = Yes; 2 = No.

25. For how many issues have you had a continuous subscription to *Ares*? 0 = I do not subscribe; 1 = This is my first issue; 2 = Second issue; 3 = Third issue; 4 = Fourth issue; 5 = Fifth or sixth issue; 6 = Seventh or eighth issue; 7 = Ninth or tenth issue; 8 = Eleventh or twelfth issue; 9 = I am a *Lifetime Subscriber* to *Ares* (regardless of the number of issues received).

26. Your age: 1 = 13 years old or younger; 2 = 14-17; 3 = 18-21; 4 = 22-27; 5 = 28-35; 6 = 36 or older.

27. Your sex: 1 = Male; 2 = Female.

28. Education: 1 = 11 years or less; 2 = 12 years; 3 = 13-15 years; 4 = 13-15 years and still in school; 5 = 16 years; 6 = 17 years or more.

29. How long have you been playing conflict simulation games? 0 = less than a year; 1 = 1 year; 2 = 2 years . . . 8 = 8 years; 9 = 9 or more years.

30. What is the average number of hours you spend playing simulation games each month? 0 = none; 1 = 1 hour or less; 2 = 2-5 hours; 3 = 6-9 hours; 4 = 10-15 hours; 5 = 16-20 hours; 6 = 21-25; 7 = 26-30; 8 = 31-40; 9 = 41 or more hours.

31. How many simulation games (of all publishers) do you possess? 1 = 1-10; 2 = 11-20; 3 = 21-30; 4 = 31-40; 5 = 41-50; 6 = 51-60; 7 = 61-70; 8 = 71-80; 9 = 81 or more.

32. What level of complexity do you prefer in games? Rate your preference on a 1-9 scale, with higher numbers indicating increased complexity. Use the following games as guidelines. 4 = *WorldKiller;* 7 = *BattleFleet: Mars;* 9 = *Air War.*

33. What percentage of the games you plan to buy in the next year do you expect will be SPI games? 1 = 10%; 2 = 20%; 3 = 30%; . . . 9 = 90%.

34. Pick the one area of science fiction that you most enjoy reading: 1 = Space opera/science fantasy; 2 = "Hard" science fiction adventure; 3 = Problem-solving hard science fiction; 4 = Extraterrestrial societies; 5 = Future societies (utopia/dystopia); 6 = Alternate history; 7 = Time-travel; 8 = Soft science fiction (a.k.a. "new wave"); 9 = Other (please write in the category description).

Questions 35 through 43 ask you to rate your interest in different kinds of science fiction games on a scale of 1 to 9, with "1" indicating very little interest in seeing games of this kind appearing in Ares to "9" indicating a strong interest in seeing such kinds of games appear in Ares.

35. Strategic space conflict
36. Tactical space conflict (ship to ship)
37. Strategic planet-bound conflict
38. Operational planet-bound conflict (army vs. army)
39. Tactical planet-bound conflict (man to man)
40. Alternate history conflict
41. Conflict in contemporary setting
42. Role-playing adventure
43. Economic/sociological/political

44. How many science fiction games do you own (including the game in this issue)? 1 = 1; 2 = 2; 3 = 3; 4 = 4; 5 = 5 to 10; 6 = 11 to 15; 7 = 16 to 20; 8 = 21 to 25; 9 = 26 or more.

45. Pick the one area of fantasy that you most enjoy reading: 1 = Sword and Sorcery; 2 = Mythological fantasy; 3 = Quest adventure; 4 = Classically-based fantasy (e.g., Arthurian legend); 5 = Fantasy in a contemporary setting; 6 = Superhero/heroic adventure; 7 = Anthropomorphic fantasy (e.g., *Watership Down*); 8 = Horror/occult; 9 = Other (please write in the category description).

Questions 46 through 53 ask you to rate your interest in different kinds of fantasy games on a scale of 1 to 9, with "1" indicating very little interest is seeing this kind of game appear in Ares and "9" indicating a strong desire to see this kind of game appear in Ares.

46. Strategic sword and sorcery boardgames (army vs. army)
47. Tactical sword and sorcery boardgames (man on man)
48. Quest/adventure boardgames
49. Sword and sorcery role-playing
50. Quest/adventure role-playing
51. Classically-based fantasy (e.g., *The Iliad*)
52. Anthropomorphic fantasy
53. Horror/occult

54. How many fantasy games do you own? 1 = 1; 2 = 2; 3 = 3; 4 = 4; 5 = 5 to 10; 6 = 11 to 15; 7 = 16 to 20; 8 = 21 to 25; 9 = 26 or more.

55. If you are a subscriber to *Ares*, indicate how you came to be one: 1 = An ad in *Strategy & Tactics;* 2 = An ad in *Analog;* 3 = An ad in *Games;* 4 = An ad in a previous issue of *Ares;* 5 = An ad in a sf/f gaming magazine; 6 = An ad in a science fiction magazine; 7 = An ad in a science fact magazine; 8 = An ad in another kind of magazine not mentioned; 9 = Other (please specify on the Feedback card).

56. Do you own or plan to buy one of the following microcomputer systems? 0 = I have no interest in microcomputers or microcomputer gaming; 1 = I own an Apple II; 2 = plan to buy an Apple II; 3 = own a Radio Shack TRS-80; 4 = plan to buy a TRS-80; 5 = own an Atari 800; 6 = plan to buy an Atari 800; 7 = own some other microcomputer; 8 = plan to buy some other microcomputer; 9 = have no plans to buy a microcomputer because I already have access to a microcomputer.

Questions 57 through 66 ask you where you buy adventure/hobby board and role-playing games. Please answer the following questions using the following scale: 0 = I never buy games by this method or through this kind of store; 1 = I rarely buy games this way; 2 = I occasionally buy games this way; 3 = I usually buy games this way, but occasionally by other means; 4 = I almost always buy games this way.

57. By direct mail from the game manufacturer
58. By direct mail from independent game retailers
59. In adventure gaming specialty stores
60. In hobby stores
61. In general game and toy stores
62. In chain department stores (e.g., Penney's)
63. In independent department stores
64. In general merchandise stores
65. In discount stores
66. By other means (please describe at bottom of feedback card)

If you buy computer games for any computer system, please answer questions 67 through 76 indicating in which kind of store you purchase them, using the following scale: 0 = I do not buy microcomputer games; 1 = I rarely buy games at this kind of store; 2 = I occasionally buy games at this kind of store; 3 = I usually buy games at this kind of store, but occasionally at others; 4 = I almost always buy games at this kind of store.

67. Franchised computer outlets (e.g., Computerland or Radio Shack)
68. Independent computer outlets
69. Adventure gaming specialty stores
70. Hobby stores
71. General game and toy stores
72. Chain department stores (e.g., Penney's)
73. Independent department stores
74. Electronics stores
75. Discount stores
76. Other (please describe at bottom of feedback card)

77. What kind of format would you like to see for the book review column? 0 = I would prefer not to have a book review column; 1 = short, zippy, single-paragraph reviews of a number of books; 2 = medium-length reviews which discuss a half-dozen or so books in some detail; 3 = longer, in-depth reviews of two or three books per issue; 4 = longer, critical discussions of sf works (criticism rather than reviews); 5 = some other format (please describe on feedback card).

78. What kind of format would you like to see for game/software/role-playing equipment reviews? 0 = I would prefer not to see any games reviewed; 1 = short, zippy, single-paragraph reviews of a number of games; 2 = medium-length reviews which discuss a half-dozen or so games in some detail; 3 = longer, in-depth reviews of two or three games per issue; 4 = longer, critical discussions of sf/f games (criticism rather than reviews); 5 = some other format (please describe on feedback card).

Rate the following game proposals on a scale of 1 to 9, with 1 indicating very little intention to purchase if published and 9 indicating a definite intention to purchase if published.

79. Battles in the Deep. Today the depths of the ocean are patrolled by a few fleets of submarines of the superpowers. In the future, with the colonization of the ocean floor, the underwater arsenals will be greatly expanded and diversified. *Battles in the Deep* would explore the many facets of underwater combat in the 22nd Century on a squad and individual vehicle level. Rules covering sea sleds, torpedoes, powered frogmen, bubble cities and forts, porpoises, and, of course, submarines of all sizes and types would be included. The 22" × 34" game-map would portray a wide variety of underwater terrain. 200 counters would be used on the map in a three-dimensional movement system. A number of scenarios, including the discovery of an ancient aquatic race would allow many combat situations to be played. A possible *Ares* game to sell for $12.

80. The Gates of Chaos. Professor Godfrey, an eccentric scientific genius, has invented a dimensional travel machine. He has visited various dimensions gathering a host of exotic creatures and has unwittingly allowed them to attack his home dimension (our earth). In addition, the dimensional portals have disturbed the fabric of reality causing earthquakes, volcanic eruptions, hurricanes and other calamities throughout the world. The government has obtained a copy of the dimensional machine and is sending an exploration/combat team through it to chart the unknown dimensions and to stop Professor Godfrey. In *The Gates of Chaos*, each player would play a member of this elite squad of men. The game would include two maps on one 22" × 34" sheet — one detailing earth-like and exotic environments while the other would be a tactical combat display. Some dimensions would be similar to our own while others would have drastically different physical laws; the adventurers would not know their own or their weapons' abilities until tried. 200 counters would be included, and the rules would contain encounters with a variety of dimensional creatures and races, negotiation

or combat with same, and methods for controlling the dimensional portal. A possible *Ares* game to sell for $12.

81. The Arcturus War. In 2335, the human interstellar federation makes first contact with the Aleri, a star-faring race of carnivores. In the Arcturus star system [38 LY from Sol] a powerful Aleri clan invites human colonists to share its naturally rich worlds. At first co-development is peaceful, but soon human corporations violate the strict Aleri code of protocol by attempting to uncover the secrets of the Aleri high-tech cities and spaceports. After Aleri demands that the human settlers leave Arcturus are ignored, war breaks out. It is the only war between the Aleri and humans and it is limited to the Arcturus system, but it is bloody nonetheless. *The Arcturus War* would recreate this inter-species war drawn from concepts in the forthcoming *Universe* First Contact supplement. The game would be complete and playable on its own and also could be used in an ongoing *Universe* campaign. It would include a 22"×34" map showing the planets, moons and other points of contention in Arcturus with detailed minimaps of each world's surface; 200 counters representing Aleri and human spaceships, outposts, groundforces and leaders, and 16 pages of rules. A possible *Ares* game to sell for $12.

82. The Games of Rigel. Jak Junz, of 30th Century Sol III, has been caught by the Rigellian Slavers, and sold to the death games. There he must fight for his life until he either escapes, captures the heart of a Rigellian noblewoman or survives through the grand finale. Will he be pushed out into the morass to fight a Centaurian Swamp Beast? Will he be forced onto a sandy oval to face a flying Sirian Flit-lizard? Will he be given an electro-whip, a stunwand, or an ancient Japanese Katana? *The Games of Rigel* creates man-to-man, man-to-beast and beast-to-beast combat in the far future, with the addition of psionic, chemical and transportational oddities. Intrigue outside the arena itself might result in the escape of participants, especially if Jak finds himself having to deal with his old Sol IV companion, Zxblemnev. Characters that survive a tournament would advance in prowess and versatility. A 22"×34" map of several different combat arenas, 100 counters of various sizes, and a 24-page rules book would be included. The combat system would allow tactics to be optimized for the varying conditions of weaponry, defensive tegument and terrain. A possible *Ares* game to sell for $12.

83. Rex Galactica. The Emperor of the galaxy has died heirless. Individuals high and low immediately scramble to seize the throne and mobilize their forces to hold the title against all rivals. *Rex Galactica* will be a game fo 3 to 6 players simulating this star-spanning power struggle. Each player will represent a single personality rated for military, diplomatic and other abilities attempting to enlist the aid of the Imperial Guard, the Imperial Intelligence Network, the Star Fleet, the Security Police, the official priesthood, the bureaucracy, the independent star systems, the space pirates or the merchant guilds. A player must then use his allies to claim the crown and fight off all contenders. Random events such as popular support and dissatisfaction, defections, planetary catastrophies and assassinations will spice up this wild game of dealing and backstabbing. To include 400 counters, a 22"×34" gamemap showing the galactic empire, power cards, and 16 pages of rules. To sell for $20.

84. The Stainless Steel Rat Strikes Again. The universe is in trouble once more! Something lies deep in the tangled maze of Pittsville, the capital city and hotbed of vice on Fomalhaut III — something that could wipe the whole Fomalhaut system off the interstellar register. Someone has stolen a working prototype of the X-bomb, a device as small as a briefcase with destructive power beyond description. The only man with enough technical know how and criminal connections to penetrate the dangerous streets and skyways of Pittsville and recover the X-bomb is called: James Bolivar "Slippery Jim" diGriz, the Stainless Steel Rat! Our rogue hero must enter the city in secret, locate the bomb before its possibly crazed guardians can detonate it and get the device out of Pittsville — all the while avoiding the everyday hazards of life in the lawless town. *The Stainless Steel Rat Strikes Again* would be played on a colorful 22"×34" map of Pittsville with 200 counters, using a solitaire hidden-information/encounter game system featuring ideas from *Citadel of Blood, Voyage of the Pandora* and, of course, *Return of the Stainless Steel Rat*. If published in *Ares*, a new story by Harry Harrison will accompany the game (subject to agreement with the author). To sell for $12.

85. Wizards' War. Since the 10th Century — after the Second War of Magic — the Sorcerers Guild has agreed to practice their dark arts secretly, allowing the rest of the world to develop their societies and technologies in peace. Now, however, in the 20th Century new trouble is brewing, and the terrible War of Magic is ready to be loosed again. Unknown to the common populace, sides are being drawn up for the great confrontation between those mages who would seize control of their peers and the mundane world, and those who would keep magic safely away from the mass of humanity. *Wizards' War* would include two games in one system. In the strategic game, each side attempts to gain allegiance from the great sorcerers around the world, building up an army and performing long and arduous rituals to withstand the final combat. A player must decide whether to reveal his powers to the world and perhaps daunt them into serving on his side, or keep his magic secret and hope that the terrible technologies of modern war will not be brought into play. As the armies clash, a tactical display will allow players to use their magical powers in sorcerer-to-sorcerer conflict. *Wizards' War* would include a 22"×34" sheet with a world map, and tactical displays; 200 counters representing sorcerers, military units, and markers; and 16 pages of rules. A possible *Ares* game to sell for $12.

86. Mordred. "Gads, *another* quest? You're daft, Sir Frog! I've barely recovered from my last ordeal." Mordred, the pragmatic rogue created by Ian McDowell (*Ares* nr. 11), is forced — against his will naturally — into a number of quests, each more dangerous than the one before. This solitaire fantasy game would present a player with a number of requirements to successfully fulfill a quest; Mordred is given the choice of finding the practical solutions to his dilemmas, or of acting like one of the romantic twits of the Round Table. The object is to survive, yet at the same time not besmirch his honor so badly that Arthur would cast him out. The map would be a colorful 22"×34" sheet showing the climes of Camelot; 200 counters would show the knights of the Table, rogue knights, monsters and magic folk Mordred continually confronts; the rules book would contain a number of discrete quests, which may overlap forcing Mordred to undertake a number of quests at once. Rules would cover jousts, slaying monsters, seduction, cowardice, and unexpected bravery. A possible *Ares* game to appear with a story by the author (subject to agreement with Mr. McDowell), to sell for $12.

87. The Dark Dimension. There is a gate to another dimension — a strange place whose very laws of reality change from time to time. Magic will open the gateway to this strange dimension, where adventurers will find great treasures, bizarre weapons, and the path to great power as well as terrible monsters, surprising self-realizations, and death. Many are willing to try their luck in this land of horror and delight, but only a few return with their original purpose completed. *The Dark Dimension* is a game of fantasy and technology for one to six players who take on the roles of adventurers in search of power, glory and wealth. Each character begins with certain abilities — magic, stealth, combat, technology, etc. — when entering the dimension; these abilities will either help or hinder the characters in their search depending on the direction they choose. The dimension changes from game to game — it will always contain two dualisms; between science and magic, or between good and evil, or between truth and falsehood, etc. The dimension is created from 50 1"×1" playing chits with paths, structures, odd terrain, and dead ends that may be explored. If a character discovers he is moving in the wrong direction, he may have to split from the party and head in another direction where his attributes may be used. The game would include 100 addition counters and rules booklet with random encounter tables and descriptions. A possible *Ares* game to sell for $12.

88. Tiana Highrider. A war of magics is being waged between the wizards Ekron and Pyre. Only Tiana Highrider, her foster father Caranga, and her pirate crew are able to help Pyre defeat the terrible minions of Ekron, but always at great risk. *Tiana Highrider* is a solitaire game of high fantasy based on the popular *War of the Wizards* trilogy by Andrew Offutt and Richard Lyon. Tiana faces a number of specific quests that take her and her crew across the face of the earth in attempts to defeat the minions of Ekron. Always interested in making a tidy profit for her troubles, Tiana stumbles into the dark places and the terrors of the nameless ones Ekron has set out for her — particularly the dread Eyes of Sarsis. If she can gather enough companions and magics, she will be able to defeat Ekron, else she may languish as a slave in some demented king's harem or end up a sacrifice to Drood of the Thousand Arms. The game would include a 22"×34" map of the known and unknown lands, 200 playing pieces, and rules booklet with quests that Tiana must undertake. Special rules would cover the intervention of the wizards, equipping Tiana's ship *Vixen* with men and supplies, adding new companions or destroying enemies, and making profit from raids, amorous conquests, and combats. A possible *Ares* game to sell for $12. Available subject to agreement with authors.

89. Bestiary of Known Space. A *Universe* supplement containing 100 to 150 new creatures of all types and sizes. Each creature would be presented in an expanded version of the existing format. Many creatures drawn from existing science fiction stories would be included. Details on the relationship of creatures to each other and simple communities set up by the more intelligent creatures would be presented. Many of the creature descriptions would be extensive enough to center entire adventures around. To sell for $8.

90. Combat Expansion Set. A *Universe* supplement with a selection of Action Display maps (using 25mm hexes) showing a variety of encounter and combat settings. 200–400 cardboard counters of various shapes and sizes would represent characters, NPC's, creatures, vehicles, structures and terrain obstacles. Descriptions of additional personal fighting gear and special combat rules applying to the settings provided would enhance the existing combat system. Blank Action Displays would be provided for the GM to draw his own settings on. To sell for $15.

91. Castaways on Pollux. During the Federation's subsidized exploration push in 2315, two identical long-range exploration craft hyperjump to the uncharted Pollux star system. The missions of the *Currier* and the *Ives* are to collect information on the natural resources of the system. However, the ships are damaged upon coming out of hyperjump and are barely able to limp to the second planet in the Pollux system. There they each manage a hard landing, but they come down 100's of kilometers apart. Worse, the *Currier*'s hull is breached and the *Ives*' navigation system is shot. Between the two wrecks one operating ship can be reconstructed; since they were designed as mutual backups, the whole combined crew could then get home — if the necessary equipment from the *Currier* can be moved across the unknown wilderness. *Castaways on Pollux* would be a *Universe* adventure that may be played without a gamesmaster. Any number of players (from 1 to 6) that know the *Universe* game-system may be led through the adventure by a sophisticated paragraph/encounter system. It would include 40 pages of background, encounters, play aids and information on the Pollux system to be used without a GM. To sell for $8.

92. Divinity. A religion supplement for *DragonQuest* which would add a new character profession, Priest. Explained would be a "miracle" system, totally different from any pseudo-magic religion system now existing in the hobby. Also included would be rules for establishing different cults, how to become a High Priest, and how to construct your very own temple. A fully developed pantheon will be included with instructions for the creation of others. A 72-page booklet. To sell for $10.

93. Treasure Hoards. Information to aid the *DragonQuest* GM in the placement and amount of treasure to be "discovered" in his campaign. Lists would include magic items, gems, jewelry, coins and miscellaneous items. All would be keyed to monster type and adventure difficulty. Various examples of hoards would be given. Also included would be differing monetary systems and conversion charts. A 40-page booklet. To sell for $8.

94. Under the Gaze of the Tarot. This would be a *DragonQuest* adventure generation system using an actual Tarot deck and not requiring a GM. There would be a number of detailed adventure situations, and the players would choose which they desired to play at one sitting. The supplement would then guide them via paragraphs to decision points, at which time the Deck would decide the outcome of the event, based on the situations presented. The characters would choose certain divinatory meanings from amongst those given, and that would send them further into the adventure. This system would need no GM, and play would be entirely different each time through, due to the readings of the cards. The paragraphs would function mainly as visual aids, giving the players some idea where they were and what they were doing there. GM's would use this supplement to aid them in the design of their own scenarios. One 32-page booklet and a Tarot deck. To sell for $12.

95–96. No question

Questing

A Regular Feature for DragonQuest Players

by Gerry Klug

First, some old business. For those owners of the First Edition *DragonQuest*, we have available the new, all-encompassing *DQ* addenda (including a summary of the revised combat system), which will bring your text up to the state-of-the-art. It is available if you send in a self-addressed, stamped envelope with your request for the *DragonQuest* Addenda Sheet.

I want to encourage all of you to write me directly and let me know your feelings on any subject related to *DQ*. I'll try my best to answer what I can, but, at least, you'll help keep me from feeling unwanted. I am also interested in feedback on what you would like to see appear in future Questing columns. I know what I'd like to write about, but would like to hear your input as well.

Character Generation

Perhaps no other system of *DQ* has received as much criticism (other than the original combat system) as Character Generation. I am not quite sure why, and so I'd like to share some changes I've made in it which have proven successful in my campaign.

First, players questioned why they rolled up their Aspects after they've made their characteristic and racial choices. They may have planned a Pacifistic Earth Healer Adept and rolled Death as their Aspect. Where does that leave them? So, Aspect is now rolled after point generation, but before the points have been distributed. This switch seems to make more sense, and allows the players to make more intelligent choices with their characteristics and their race. Also, the Aspect Table has been expanded to look like this:

01-05 Winter Stars, Air Sign
06-10 Winter Stars, Water Sign
11-15 Winter Stars, Fire Sign
16-20 Winter Stars, Earth Sign
21-25 Spring Stars, Air Sign
26-30 Spring Stars, Water Sign
31-35 Spring Stars, Fire Sign
36-40 Spring Stars, Earth Sign
41-45 Summer Stars, Air Sign
46-50 Summer Stars, Water Sign
51-55 Summer Stars, Fire Sign
56-60 Summer Stars, Earth Sign
61-65 Fall Stars, Air Sign
66-70 Fall Stars, Water Sign
71-75 Fall Stars, Fire Sign
76-80 Fall Stars, Earth Sign
81-85 Sun
86-90 Moon
91-95 Life
96-00 Death

The *Signs*, of course, correspond to the assumption in the world of *DQ* as to what the four elements are and the corresponding four elemental Colleges of Magic. Thus, whenever a player is involved in a situation in which his astrological sign comes into play (being affected by magic of an opposite element, for example), I allow a die roll bonus (up to plus or minus 10, depending how well that player has been role-playing his character's Aspect) in his favor to any roll affecting him. Also, if he chooses a College which matches his sign, all spells, rituals, and talents are given a +1 to their Base Chance to begin with, which may later be taken away or increased depending on how well the character is played. This alteration gives a little additional flavor and comes closer to the original intent of the Aspect system.

I found the Characteristic Modifiers for each racial type extremely conservative, so I doubled each modifier except APA (or TMR) for each race (even this may still be too conservative). Try this method out and let me know your feelings.

Also, an Elf should receive a magical talent, *Witchsight*. Treat this as the Witchsight listed for the College of E&E (Ensorcelments and Enchantments, T-1). This talent works as described and may be advanced in rank as any Adept would advance it. It is not affected by the presence of Cold Iron.

I immediately struck out the nonsense about a player having to roll to see what sex he or she was. Any player may play any sex. Period.

I've added a couple of additional character races to liven things up. I run a very Tolkienesque campaign (with very significant additions and changes) and felt the two following races were needed: the Half-elf and Lizard-man.

[6.51] **A Half-elf is a rare crossbreed between men and elves who may be found mingling with either race.**

Traits: Half-elves are traditionally found in the role of mediators in disputes between men and elves. Upon reaching maturity, they must choose whether they will follow the "Doom of Men" or the "Doom of the Elves"; that is, whether or not to become immortal. In either case, they tend to live in populated areas and are often found as leaders.

CHARACTERISTIC	*MODIFIER*
Physical Strength	Subtract 2
Willpower	Add 3
Perception	Add 2
Endurance	Subtract 2
Fatigue	Add 2

Special Abilities: 1.) Half-elves receive a +10 on reaction rolls involving men, elves, and dwarves. 2.) If the Half-elf takes the Healer skill, he expends *three-quarters* the Experience Points to progress in ranks. 3.) If the Half-elf takes the Military Scientist skill, he expends *three-quarters* the Experience Points to progress in ranks. 4.) The "resurrect the dead" ability of Healers is only available to those Half-elves who choose the Doom of Man.

Estimated life span if Elvish Doom: Ca. 30,000 earth years.

Average life span if Human Doom: 200 to 300 years.

To be a Half-elf, a player must roll an 09 or less. A Half-elf's Experience Multiplier is 0.9.

[6.81] **A Lizard-man is a rebellious member of his parent race, the Suarime (see Monsters, 69.1).**

Traits: Lizard-men (and women) have traditionally been looked upon by most other races as residing just below orcs on the social ladder, and thus have spent many long centuries as loners, very proud of their clannish heritage. They are convinced that if only they would be accepted for their merits they would prove a useful addition to society. They are rarely found much above the subtropical zone since they tend to retain their racial dislike for colder climates.

Special Abilities: 1.) See 69.1 for all abilities of Suarime. 2.) Lizard-men receive a −10 on reaction rolls involving *any* other race except their own, where they receive a +10. 3.) If a Lizard-man takes the Ranger skill and specializes in a Marsh environment, he expends *one-half* the number of Experience Points to progress in ranks. 4.) If a Lizard-man takes the Courtesan skill, he expends *double* the amount of Experience Points to progress in ranks. 5.) A Lizard-man *character* may never exceed the characteristic values listed in 69.1 by more than *two* in each characteristic. This replaces any characteristic modifiers normally used for character generation. The player may need to juggle his characteristic points at this juncture to meet the characteristic ranges given. 6.) A Lizard-man character is not limited by the weapon choices listed in 69.1; he may choose whatever he feels would suit him best. 7.) During characteristic point allocation, a Lizard-man character may ignore the maximum value assigned to his point group, but must still allocate at least 5 to each characteristic.

Life Span: 125 to 175 earth years.

To be a Lizard-man, a player must roll a 13 or less. Its Experience Multiplier is 1.3.

Giants

Giant characters have proven a problem for many GM's to create. The rules were unclear on this point and resulted in many arguments between players and refs. I will try to clear up the confusion. If a Giant is generated, the GM must do some interpolation to arrive at the correct values for PS, EN, and TMR. APA would be calculated normally.

To determine PS and EN, the GM must compare the character's chosen value for

[continued on page 38]

UNIVERSE CommLink

A Regular Feature for Universe Players

by John Butterfield

Universe has generated a lot of interest very quickly; so, to keep in touch with its devotees, Universe CommLink will appear in every issue of *Ares*. I would like to begin with an apology. The name of an important contributor to *Universe* was unwittingly left off the credits. John Boardman provided me with reams of information and helped with the calculations that made production of the *Universe* interstellar display possible. I'd like to use this first column to state where we stand with the ongoing *Universe* project. In columns to come I'll present notes on NPC generation, a combat aiming and ammunition system, a spaceship record and a lot of other little ideas.

The Public Speaks

Included in *Universe* was an 8½" × 11" sheet of feedback questions and a response card much like the feedback section in *Ares*. An early sampling of these cards gave us a strong feeling for what is desired in terms of future *Universe* product. The top eight vote getters among possible publications are (in order):

Universal Hardware (Question 35, also in *Ares* 9 Feedback). This is running away with the early lead; I guess you're all equipment freaks. I'm hot on getting this one out as well. At the moment we plan to combine this proposal with the *Harmonics Catalog* proposal (see below) to create a big *Universe Equipment Guide*. Every weapon, robot, vehicle, spaceship and other piece of technology mentioned in the GM Guide will have an illustration or schematic diagram and an expanded explanation detailing all its specs and functions. Many new types of equipment will also be included. The book will probably be larger than the GM Guide and will come out in the late summer of '82.

First Contact (#41). This is already in development and will be published in February, '82; see below.

Universe Magazine (#50). We do not at the moment have the production capacity to put out another regular magazine. We hope to start up a role-playing magazine in the not-to-distant future that will feature *Universe* and *DragonQuest* adventures, additions and advice, as well as information and reviews on all role-playing products. For the time being, attention to *Universe* will increase in *Ares*, beginning with this column in every issue and mini-adventures in every other issue to come.

Harmonics Catalog (#39 and in *Ares* 9). This spaceship supplement will be combined with *Universal Hardware;* see above.

Combat Expansion Kit (#45). Although we plan to do this at some point, it is not yet scheduled. Much of the detailed weapon information planned for this supplement will appear in the hardware supplement.

Space Stations and Orbital Craft (#36 and in *Ares* 9). Publication is distant.

GM Pack (#43). The GM screen and the world generation logs have already been published; see below.

Metropolis (#38 and in *Ares* 10). This one excites me the most. The city map should be a real beauty. We hope to produce it by the end of '82.

The Bestiary of Known Space, Cygnus Carina Arm and **Federal Forces** proposals also did well. The real loser of the group was **Innerspace**; a supplement about underwater and underground adventuring. I guess no one likes to get wet or dirty in the future. The most popular parts of *Universe* according to you were the Interstellar Display, the Orionis World Logs, and the rules for world generation, skills and character generation. The sections you feel are in the most need of expansion are spaceships and creatures, NPC's and other encounters.

It has come to my attention that many copies of *Universe* included the feedback response card but not the questionnaire. If you found this to be the case in your game, send the card to us blank, except for your name and address and I'll send you a question sheet and a new card. It's early yet in response tabulation so we still want to get more responses.

GM Pack

You've probably seen ads for the *Universe GM Pack* in *Ares* recently. The pack includes an 11" × 34" four-color Gamesmaster's screen and a 96-page book of blank environ, world and star system logs. Aside from putting the commonly used charts and tables right in front of the GM, the screen includes a few new summaries that increase its utility. The Skill Summary takes up an entire panel of the screen and lists in brief the use, related equipment, and Experience Point die rolls for every skill in the GM Guide. The Movement Rate Calculation Summary gives quick equations for figuring character and vehicle movement rates. The Base Repair Time Summary lists the hours required to repair different equipment types (some of these were inadvertently omitted from the GM Guide). It should be noted that in the book of world logs, size 8 and 9 worlds are printed so that each is on one 11" × 17" sheet of paper. The book should be taken apart to use these large logs.

Star Trader

Nick Karp designed *Star Trader* over the summer but was unable to finish it before returning to Princeton. Since I designed *Universe*, and *Star Trader* draws on the *Universe* background, the completion of the project fell in my lap (mainly work on the rules, the system displays and the countermix). I think the game's best use in *Universe* is as an economic record for the GM's systems. A *Star Trader* system display can be filled out and attached to the *Universe* system log. If a system has more than one economically active world, a separate *Star Trader* display can be used for each planet (keep in mind that prices of goods on worlds in the same system will not vary nearly as much as prices in different systems). The News Chit system is an excellent adventure and encounter generator, even if the characters in the GM's campaign are not merchants. The players may be hired by a corporation to find or take advantage of the information on a chit. *Universe* characters will rarely be in the financial position to run a corporation like those in *Star Trader,* but may certainly get caught in the middle of all the wheeling and dealing.

First Contact: Three Star-Faring Alien Races

Our first *Universe* supplement is in the late stages of development now. Greg Costikyan contributed a long essay and character generation system for the Sh'tk'lp (see the Designer's Notes in this issue). I am now completing information on their spaceships and technology. Ted Woods created the Aleri, a clan-oriented race of intelligent carnivores, in which characters can also be generated. Bob Kern is preparing the manuscript for publication. I am also working on a symbiotic, xenophobic race (called the Sarkers by humans). Greg Gerrold and Steve Gray are working on a full-length adventure that sends the players to a system beyond explored space where they encounter a spaceship of unknown origin (but not for long). A number of new skills and professions for human and non-human characters created by David Spangler will be included. An extensive chronology of events will present a background for interaction between the Federation and all the races and also provides the GM with dozens of adventure ideas. The book will be 64 pages long with lots of illustrations and will come with a 22" × 17" stellar display showing Federation space and the domains of all three alien races.

Adventures

The *Devil's Eye* mini-adventure originally slated for this issue (see Designer's Notes in *Ares* 10) has been delayed to issue 14; not because it won't be ready, but there is a glut of material ahead of *Devil's Eye* that the editors want to see published. More *Universe* mini-adventures will be appearing in every other issue of *Ares* (alternating with *DragonQuest* adventures). The big news is that we wil be publishing a trilogy of full-length *Universe* adventures in June '82. This 64 to 72-page book will contain three independent adventures for a GM and three to seven players. We are also negotiating with outside role-playing companies to produce *Universe* adventures under our editorial guidance. ■■

QUESTING *(continued from page 36)*

that characteristic as opposed to the average value for a human character (15). This plus or minus modifier is then compared to the average value in that characteristic for that particular type of Giant. The amount above or below the human average is then translated as directly as possible to the Giant's characteristic. For example, a character is generated with a PS of 20 and an EN of 12. Compared to 15, these values are +5 and −3, respectively. The player was successful in dicing for a Giant, and generated a Fire Giant. A Fire Giant's average PS is 24 and average EN is 29. Thus, the character's PS would be (24 + 5) = 29; his EN would be (29 − 3) = 26. A more complex and accurate method would be to apply *percentage* differences (e.g., 20 is 33% greater than 15, therefore the average Giant PS of 24 should be increased by 33%, or 8, yielding 32). Whichever method you prefer should be used.

For a Giant's TMR, first a similar average TMR must be found for the particular Giant type to compare with the average human TMR of 5. For Fire Giants, the average TMR is 9. This replaces the TMR of 5 on the chart in 5.6. The TMR modifiers are then applied as if the midpoint was 9, so a Giant with a modified Agility of 18 would have a base TMR of 10 (9 + 1), just as a human would have a TMR of 6 with an Agility of 18. Then the racial modifier for Giant characters would bring that back down to 9. In this regard, Giant characters are slightly worse off than Giant NPC's, due to the hesitancy they have developed by dealing with the smaller, more delicate races of men and elves during their adventure life. They are more afraid of stepping on their smaller companions, while Giants living in the wild, so to speak, amongst their own kind have no such worry. They just stomp around wherever they like.

Experience Points

After any new characters have received their initial allotment of experience points, I allow the characters to expend those points in any fashion they see fit. I set no limit on the rank they can achieve through this method; this takes no time and requires no teacher. Many GM's do this also, and I mention it here simply to impart this knowledge unto those who are unaware. I find that characters created in this manner are more individualistic.

I am very interested in any alterations or additions you have made in character generation in your world. Please advise me and I will gladly share all those great ideas with everyone.

One last thing: We are actively soliciting capsule adventures for publication in *Ares;* see *DragonQuest* Update in Designer's Notes for details as to how to go about getting further info. This pays real money, folks, so get your pens out and start letting us in on your wonderful worlds. ■■

DESIGNER'S NOTES *(continued from page 18)*

innumerable creatures better suited to shape-changing than the sht'kl'p — some of whom are extremely dangerous predators. Consequently, sht'kl'p are necessarily a neat people. They keep everything in a precise location and use their eidetic memories to memorize the exact place for every object in their homes. If a sht'kl'p enters his room, for example, and finds that his armchair has moved, he has good reason to suspect that the armchair is actually a predator about to eat him. Consequently, the instinctual reaction of a sht'kl'p in such a situation is to pull out his laser-pistol and blow away the predator — or armchair.

Consequently, the most notable mental characteristic of the sht'kl'p is their compulsive neatness, a trait which human characters will probably find exasperating.

The sht'kl'p character generation system is similar to that for human characters, but is designed to reflect their all-pervading bureaucracy and social system and, of course, describes how shape-changing abilities are used in play. Skills and professions available only to the sht'kl'p and a guide to their technology and asthetics will allow the GM and players to get into the alien mindset.

The other two alien races have been handed in to John for final review, but in any case I will leave it to John and Ted to describe them in future issues. Suffice it to say that Ted plans a race of lupine carnivores with strong family ties, while John is concentrating on a race of symbionts. *Greg Costikyan*

GM Alert!

We are currently looking for Gamesmasters to referee *DragonQuest* and *Universe* tournaments at conventions around the country. SPI will be the official sponsor of these events and will provide prizes. The adventure will be designed by a staff member at SPI, and if one of the staff attends the convention, the tournament will be run cooperatively by the Gamesmasters and SPI staffer. Any person who runs a session at a convention will be given first crack at playtesting new supplements and/or adventures for the game of his or her choice.

If you plan to attend any convention in the future and are conversant with the rules to the game you wish to GM, please send a self-addressed, stamped envelope with your query to either Gerry Klug (for *DragonQuest*) or John Butterfield (for *Universe*) care of SPI, 257 Park Avenue South, New York, NY 10010-7366.

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Stay tuned to this magazine for further details on ORIGINS '82 as it becomes available.

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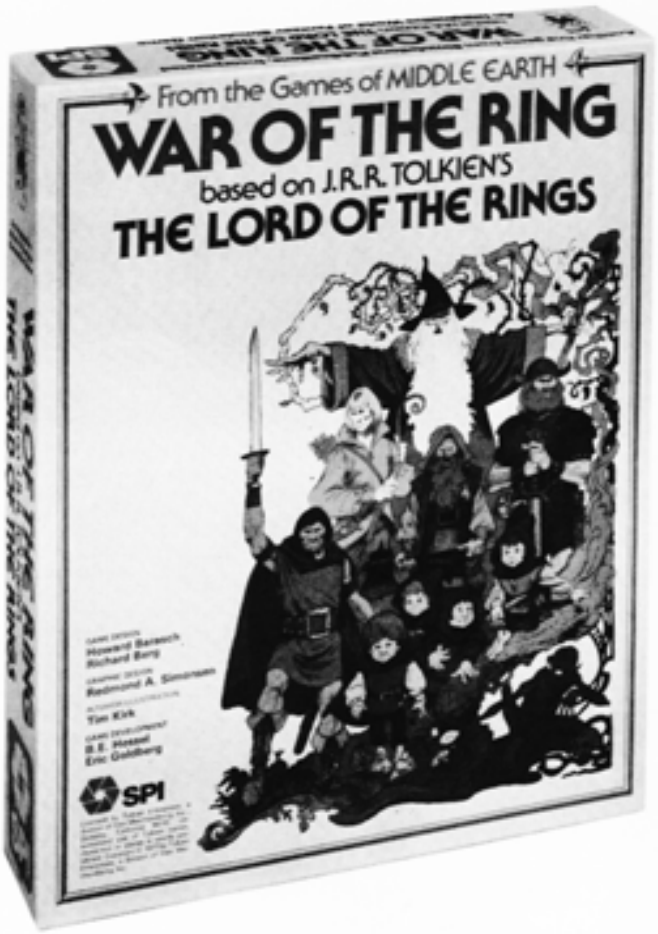
War of the Ring

Based on J.R.R. Tolkien's *The Lord of the Rings*



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Sample character card

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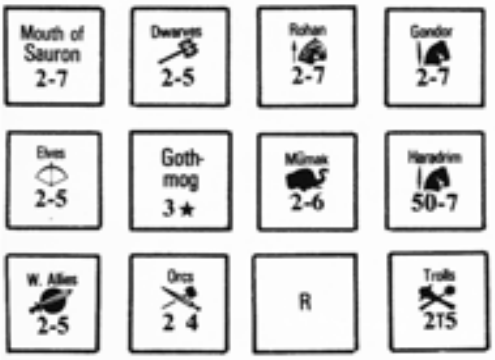
Reduced section of map from War of the Ring

Sample playing pieces



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StarTrader

Rules of Play

Read This First:

The rules to *StarTrader* are organized by major topics, called Sections, arranged in the order in which they occur in the play of the game. Each such major topic is given a number and a name, following which is usually a General Rule or description that summarizes the rules in that Section. This general overview of each rules Section is followed by numbered paragraphs, called Cases, that provide specifics of the rules. Note that the numbering of the Cases is a decimal form of the Section numbers.

Players should examine the display sheet and playing pieces and then quickly read through the rules, without trying to memorize them. The game should then be set up and a "trial run" made, with reference to the rules Cases as questions arise. In this way, players can become accustomed to the game system easily and move quickly on to a full-fledged game of *StarTrader*.

Rules Questions

We hope you enjoy this SPI game. Should you have any difficulty interpreting the rules, please write to SPI, phrasing your question so that it can be answered by a simple sentence, word, or number. You must enclose a stamped, self-addressed envelope. Write to: SPI, Rules Questions Editor for *StarTrader*, 257 Park Avenue South, New York, NY 10010-7366.

Inventory of Game Components

Each copy of *StarTrader* should contain the following components:

One 22" × 34" display sheet

One sheet of 200 die-cut cardboard playing pieces

One rules folder

Each boxed copy of *StarTrader* (not the *Ares* edition) should also contain:

Three 6-sided dice

One game box assembly

[1.0] Introduction

StarTrader is a game of interstellar economics set in the 24th Century. Each of up to six players is master of a fleet of space-faring trade vessels, competing with opponents to increase his own profits at the expense of the other players. The basic monetary unit in *StarTrader* is the HectoTran (HT), which is equivalent to 100 Transfers, or $50,000. All transactions in the game are conducted in HT's.

Players familiar with SPI's role-playing game of the future, *Universe* will find that the spaceships, Star Systems, commodities, and other features in *StarTrader* are adapted from concepts presented in *Universe*. Although designed as an independent multi-player game, *StarTrader* may be used in conjunction with a *Universe* campaign as an adventure generator or as an economic subsystem. Section 24.0 of these rules offers suggestions on using the two games together.

Three six-sided dice are required to play *StarTrader*. One, two, or three dice rolls are called for to resolve a variety of game functions. These required dice rolls are denoted by the abbreviations **1D**, **2D**, and **3D**, respectively. When rolling **2D** or **3D**, results are added to obtain a total result.

[2.0] Game Components

COMMENTARY:

Each game of *StarTrader* includes a rules booklet, a 22" × 34" Display Sheet, and 200 die-cut cardboard playing pieces. Pencils with erasers and three six-sided dice are also required to play the game.

CASES:

[2.1] The Display Sheet portrays six Star Systems among which players conduct trade.

The following features are included on each Star System Display:

Hyperjump Routes. Travel among Star Systems is accomplished by means of hyperjumping — a delicate operation involving the use of psionic powers. Emanating from each Star System Display are five routes, represented by arrow heads, directed toward the other Systems in the game. Each of these routes has an associated number (ranging from **2** through **9**) that indicates the relative chance of successfully hyperjumping along that route.

Price Track. A System's Price Track depicts each commodity that is marketable in that System, and the particular space in which a commodity is pictured represents the commodity's price at the start of the game. The spaces, marked **1** through **20**, are used to reflect fluctuations in the price of commodities in the System throughout the game.

Spaceport. The area of each System Display containing the System's name is referred to generally as the Spaceport. This area represents the System's commercial center, contained in a federally operated Spaceport orbiting the System's capital world. There are two numbers listed in this area of the Display: **Spaceport Class** (which reflects the quality of spaceship service available in the System) and **Law Level** (representing the degree of federal presence in the System). Some Spaceports also contain boxes labelled **Safe Berth** (where spaceships may be protected from sabotage) and **Shipyard** (where players may have new spaceships built).

System Space. This area of the Display represents a System's interplanetary space, where players may lie in wait in attempts to intercept incoming spaceships. The System Space area includes a **Patrol Value**, used to determine the effect of federal patrol sweeps.

On Planet. Spaceships that go directly (and illegally) to a planet, rather than to the Spaceport as required by federal law, are placed in the On Planet area. The **Security Rating** listed in this area is used to determine whether or not illegally landed ships avoid federal detection. Also listed are commodities naturally abundant in the System.

Factories and Warehouses. These boxes provide an area for each player to place any factories and warehouses he may build and maintain in a System.

Market Position Tracks. A player may rise in prominence within a System as a purveyor of one or more commodities in that System, becoming in turn a Dealer, Contractor, and Market Manager. The Market Position Tracks allow players to record their current positions in a System's markets.

Several other tracks, associated with particular game functions or players (rather than with particular Star Systems), are also provided on the Display Sheet:

Asset Tracks. As each player accumulates (or loses) assets, his current wealth is reflected on his own Asset Track, which represents the number of HectoTrans the player possesses.

Supply and Demand (S/D) Track. The market activity of each commodity in each System is determined by using this Track. Each numbered space on the S/D Track represents the number of commodity units in supply (if positive) or in demand (if negative). Associated with each S/D index number is a **Price Modifier**, which is used to alter the price of commodities once their S/D index numbers are determined.

Reputation Track. The Reputation Track reflects each player's fluctuating Reputation Level throughout the game.

Game-Turn Record Track. Each time a Game-Turn is completed, the Game-Turn marker is advanced one space along this Track until the game is completed. **News** chits are also placed on this Track during the game, until the events or opportunities they represent have passed.

The various charts, tables, and summaries included on the Display Sheet are explained in the appropriate rules Sections.

[2.2] Each player maintains his own Player Log.

Each player uses one Player Log to record his current Business, Political, and Criminal Connection Levels; the terms of any outstanding loans; bids he makes each Game-Turn to gain initiative and to buy and sell commodities; the number of units of special goods he holds; destinations to which he is committed to take passengers; and attributes and current status of his spaceships. Photocopies of the Player Log included in these rules must be made before play begins.

[2.3] The playing pieces represent assets, inventories, spaceships, and other game records.

SPACESHIP

The 14 spaceship counters (all identical, other than their ID numbers and suggested names) are assigned to players by the scenario instructions. Spaceships may also be built and sold during play. Each spaceship's specific attributes are detailed on the Summary of Ship Hull and Pod Characteristics and are recorded on the Player Log of the owning player.

COMMODITIES

The four major commodities in the game are referred to in terms of **commodity units**. The amount of a commodity in a player's warehouse or spaceship at any given time is represented by the appropriate Commodities chit, which is placed beneath the warehouse or ship. Each commodity is represented by chits of four denominations: 1, 2, 4, and 8 units. Any number of units may be indicated by various combinations of these chits (for instance, a 1, 2, and 4 chit would represent 7 units). When placed in the Factory space of a System Display, a Commodities chit represents a factory, in which case it denotes a unit of *production* rather than a unit of stored material (for instance, a Monopole-2 chit in a Factory space indicates a factory that produces 2 units of Monopoles each Game-Turn). The four major commodities (and their unit weights) are:

Magnetic Monopoles (1 kg/unit). Refined ore containing only a positive *or* negative charge. Used in psionic equipment, robots, and levitating craft.

Psycho-Spice Ampules (1 kg/unit). A natural drug used to enhance psionic powers and as a creative hallucinogen (non-addictive).

Super Isotopes (15 metric tons/unit). Refined radioactive ore with an atomic number above 140. Power source for interplanetary travel.

High-Tech Alloys (15 metric tons/unit). Complex metallic compounds (with some non-metallic elements) used in all fields of industry, especially for armor.

WAREHOUSES

Placed in a Warehouse space of a System Display, a Warehouse chit indicates that a player has storage capacity in that System. Warehouse chits are provided in four denominations (1, 2, 4, 8), which may be combined to show any amount of storage space. Each Warehouse unit may store up to 10 units of Alloys or Isotopes (or a combination up to 10 total units); one Warehouse unit may store any amount of Monopoles or Spice.

ASSETS

Each player uses three Asset markers (1 HT, 10 HT, and 100 HT) on his Asset Track. By placing

the three markers on different spaces of the Track, any amount of HT's from 0 through 999 may be recorded. If a player has 1000 or more HT's, the 100 HT marker is inverted to its 100 HT + 1000 side. Thus, if this marker were on the 3-space of the Track, it would represent a total of 1300 HT's.

MARKET POSITION

These markers (printed with different players represented on either side to maximize their use) are placed in the appropriate Market Position of a Star System to indicate that a player is a Dealer, Contractor, or Market Manager in a specific commodity.

REPUTATION

Each player's current Reputation Level is noted by the location of his Reputation marker on the Reputation Track.

AGENT

A specific individual assigned to a player by the scenario instructions or acquired during play. An agent gives a player some special advantage.

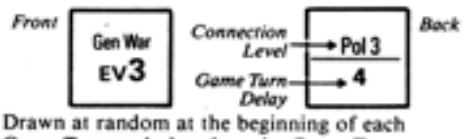
PRICE

Each commodity that has a market in a Star System is represented by a Price marker, which occupies the Price Track in that System. Each Price marker has an **S/D Modifier**, which is used to determine the commodity's S/D Index each Game-Turn. **Note**: The S/D Modifier on the back of the marker is used when only two players are playing the game.

SUPPLY AND DEMAND (S/D)

This marker is placed on and moved along the S/D Track to resolve the market activity of each commodity each Game-Turn. When the S/D marker occupies a space with a positive S/D Index, the supply of the commodity exceeds the demand; when the marker is on a negative S/D Index space, the demand for the commodity exceeds the supply.

NEWS



Drawn at random at the beginning of each Game-Turn and placed on the Game-Turn Record Track, each News chit represents an **Opportunity** for a player, or an **Event** that may affect all players.

GAME-TURN

The Game-Turn marker is placed on and moved along the Game-Turn Record Track to indicate the current Game-Turn.

Note: If Market Position, Spaceship, Commodity, or Warehouse markers run out, players may devise additional markers of their own.

[3.0] Sequence of Play

StarTrader is played in **Game-Turns**, each of which represents three months of Earth time. There is no set number of Game-Turns in a single game; play continues until one player wins. Each Game-Turn is divided into eight **Phases**. There are no specific Player-Turns as there are in many SPI games; all players are involved in every Phase of the Game-Turn. All actions by the players must proceed strictly according the following sequence outline.

1. Bid Phase

Each player secretly and simultaneously writes down how many HT's he will expend to gain **Initiative** (4.0) and to purchase or sell any commodities (12.0).

2. Initiative Phase

Each player announces, and records on his Asset Track, how much he has committed to spend to gain the Initiative (4.0), and Turn Order (for the present Game-Turn) is determined. **Note**: Players undertake some activities in Turn Order and other activities in Initiative Order (player with the highest Initiative going first), as specified throughout the rules.

3. News Phase

A. Any News chits on the current Game-Turn space of the Game-Turn Record Track are revealed and returned to the pool.

B. Fresh News chits are drawn and placed on the Game-Turn Record Track.

C. Eligible players may examine the underside of News chits on the Game-Turn Record Track.

4. Hyperjump Phase

Players may **hyperjump** their spaceships from System to System (9.0) in Turn Order. **Interception** may also occur during this Phase (10.0).

5. Transactions Phase

All player and non-player market activity involving all 18 commodities on the System Displays is carried out (12.0). The player with the highest Initiative chooses one of the 18 commodities markers, and the following steps are undertaken:

A. Non-player activity in the commodity is determined by rolling **2D** and adding the commodity's S/D Modifier to the result. The S/D marker is placed in the space of the S/D Track corresponding to this total.

B. Any players who bid to buy or sell this commodity reveal their bids. If no players bid, skip to Step D.

C. The players buy and sell units of the good, as allowed by the fluctuating position of the S/D marker.

D. After all buying and selling of the commodity is completed (if any), the commodity's market price is modified according to the current position of the S/D marker.

The player with the highest Initiative chooses another commodity, and the preceding Steps are repeated. When all 18 commodities have been dealt with (in the order chosen by the player with the highest Initiative), this Phase is concluded.

6. Opportunity Phase

The first player conducts any or all of the following activities that he wishes in any order he desires, then the second player, etc.

- Receive goods produced by the player's factories.
- Attempt to sabotage opposing players' spaceships, warehouses, or factories.
- Attempt to undermine market position.
- Hire Agents.
- Embark passengers in eligible spaceships.
- Use an Opportunity chit examined by the player.
- Sell illegal goods.

7. Investment Phase

The players perform any of the following activities simultaneously, in any order.

- Purchase increase in player's Reputation Level.
- Purchase Warehouse capacity.
- Purchase Factories.
- Purchase, repair, or sell spaceship hulls and/or pods.
- Hire or replace spaceship crews.
- Take out a loan (unless the player already has a loan outstanding).
- Pay off or pay interest on an existing loan.
- Purchase increase in any of the player's Connection Levels.

8. Inquiry Phase

A. Check each spaceship that is in a System Space box for federal patrol sweeps.

B. Any player with a Reputation Level of **5** or less may have to undergo an Inquiry; consult the Inquiry Table, if necessary.

C. The Reputation Level of any player whose current level is between **1** and **19** is increased by **3** (but not above **20**).

D. Each player who has a Reputation Level of **25** or higher receives a Reputation Bonus in the form of HT's.

E. Re-invert all spaceships (to their front sides) that have failed hyperjumps during the current Game-Turn.

If any player declares that he has fulfilled his **Victory Conditions** and can show that he has done so, the game is over. Otherwise, the Game-Turn marker is advanced one space along the Game-Turn Record Track, and a new Game-Turn is begun.

COMBAT SEQUENCE

Conducted during Hyperjump Phase, as needed.

A. Interception Segment

Players with spaceships in a System Space box declare (Turn Order) if they wish to intercept a ship entering the Star System. If interception does not occur, the Combat Sequence is concluded (return to the Hyperjump Phase). If interception does occur, proceed to Segment B.

B. Attack Segment

Each player (Initiative Order) declares whether or not he will fire at the opposing player's spaceship(s). If so, the fire is conducted and then the players take turns allocating and executing fires in a number of **Combat Rounds** until all participating players with ships capable of combat agree to have no further combat.

C. Salvage Segment

A player owning spaceships that have survived the combat may attempt to salvage cargo from enemy ships.

[4.0] Initiative

GENERAL RULE:

The order in which player perform game functions is determined anew at the beginning of each Game-Turn.

PROCEDURE:

During the Bid Phase of each Game-Turn, each player secretly writes down the number of HT's he is spending to attempt to gain Initiative. During the Initiative Phase of each Game-Turn, all players reveal their HT expenditure simultaneously, deducting the amount spent from their current assets. Each player then rolls **2D** and adds the number rolled to the number of HT's he has spent for Initiative. The player with the highest total has the highest Initiative, the player with the second highest total the second highest Initiative, and so forth.

The player with the highest Initiative chooses which place he will take in the Turn Order; then the player with the second highest Initiative chooses; and so forth.

CASES:

[4.1] **Players with identical Initiative determination totals re-roll 2D.**

Only the players who have tied re-roll the dice, and only the HT's originally spent on Initiative are added to the dice result.

[4.2] **Player order applies only to the Hyperjump, News, and Opportunity Phases.**

The first player in a Game-Turn does not perform the entire Sequence of Play before other players — he only acts *first* in the Hyperjump and Opportunity Phases, and in examining News chits during the News Phase.

[4.3] **The player with the highest Initiative determines the order of the Transactions Phase.**

The player with the highest Initiative (whether he is the first player or not) determines the order in which each commodity is dealt with during the Transactions Phase.

[5.0] Connections

GENERAL RULE:

The scenario instructions assign three Connection Levels, ranging from **0** through **10**, to each player. These Political, Business, and Criminal Connections represent a player's ability to react to events and to exploit unexpected opportunities. A player may increase his Connection Levels during play and derive certain benefits from his Connections in various situations.

PROCEDURE:

At the beginning of a scenario, each player records his Business, Political, and Criminal Connections Levels on his Player Log. Each player may increase *one* of his Connections by *one* Level in each Investment Phase by spending a number of HT's equal to **10** times the new Level, and recording the new Level on his Player Log. (**Example**: To increase a Business Connection from 4 to 5 requires an expenditure of 50 HT's.) Any changes in a player's Connection Levels must be declared to all players.

CASES:

[5.1] **No Connection Level may ever exceed 10.**

[5.2] **A Connection Level may be reduced only as a result of an inquiry.**

[5.3] **A player's Reputation Level changes each time any of his Connection Levels is increased.**

A player's Reputation Level is increased by **1** each time his Political Connection Level is increased by **1**. Reputation is increased by **2** each time the player's Business Connection Level is increased by **1**. Reputaion is *decreased* by **1** each time a player's Criminal Connection Level is increased by **1**.

[5.4] **Connection Levels directly affect various procedures.**

- All Connection Levels affect a player's ability to examine News chits.
- Criminal Connection Level affects sabotage attempts.
- Political Connection Level affects inquiries.
- Political and Business Connection Levels affect factory purchases.
- Political and Business Connection Levels affect attempts to undermine market positions.

[6.0] News

Weapons OP2

GENERAL RULE:

During each News Phase, News chits are brought into the game, to provide players with Opportunities (both legal and otherwise) and to introduce unusual Events.

PROCEDURE:

At the beginning of the News Phase, all News chits occupying the current Game-Turn space are revealed to all players, and the instructions for each revealed Event chit are followed, before the chit is returned to the chit pool. Opportunity chits remaining on the Track are also returned to the chit pool.

The first player then rolls **1D** and halves the result, rounding down, and selects the number of News chits from the pool (note that it is possible for *no* chits to be drawn). Each drawn chit is placed, with its Connection side face-up, on the Game-Turn Record Track. Note that each News chit has a number on it, indicating how many spaces ahead of the current Game-Turn it must be placed. For instance, a chit drawn on Game-Turn 5 and printed with a **2** would be placed on the Game-Turn 7 space.

Eligible players may then declare, in Turn Order, that they are examining face-down News chits (including any placed on the Track in preceding Game-Turns). A player may examine a chit only if he has an appropriate Connection Level equal to or greater than the Level indicated on the chit. (**Example**: A player needs a Political Connection of at least **4** to examine a chit marked **Pol 4.**) For each chit a player examines, he must immediately pay **5 HT**'s. When examining a chit, a player looks at the code on the back side of the chit, and consults the indicated paragraph in the News Summary to determine the chit's effect. A player cannot change the stipulations of an Event chit; he is simply provided with advance information about an event that will occur. A player who has examined an Opportunity chit may, however, act on it in any Opportunity Phase in which the chit remains on the Game-Turn Record Track. To do so, he inverts the chit during the Opportunity Phase and declares that he is taking advantage of the opportunity. The chit is then placed beneath the ship which is being used to exploit the opportunity (if applicable).

CASES:

[6.1] **After examining a chit, a player may talk about the chit, sell information concerning it, etc.**

He may not *show* the chit to another player, however. More than one player can examine a chit, if all examining players have the necessary connections and all pay 5 HT's. Once a player has examined a chit, he may examine it at any time.

[6.2] **An Opportunity Chit indicates that a special commodity or a spaceship is available for the player to purchase.**

Chits indicating legal opportunities are fully explained in the News Summary. Chits indicating illegal goods include slaves, weapons, and tempus (a potent and highly addictive time dilation drug). When an illegal commodity is available, the player that takes the chit must have a spaceship On Planet in the System indicated and must purchase from **1** to **10** units of the commodity at the price indicated in the News Summary. He may sell the goods during any subsequent Opportunity Phase in which the ship is On Planet in the System indicated. The amount received is determined by using the Black Market Table (16.6). When an illegal hull and/or pods are available, the player that takes the chit may purchase any of the listed equipment On Planet in the System indicated. He pays the requisite amounts, and the ship is placed On Planet. If the player is purchasing pods only, he must have a spaceship On Planet on which to place the pods.

[6.3] **A player taking an Opportunity chit must use it in some way, even if only to buy 1 commodity unit or pod.**

An Opportunity chit representing a commodity is held by the player until the goods are sold or lost. The commodity is kept in a ship (or in a warehouse, if legal), and the number of commodity units represented is noted in the Special Commodities section of the Player Log. Once the goods are sold or lost, the chit is returned to the chit pool. All other Opportunity chits are returned to the pool immediately after they have been taken advantage of.

[6.4] **Certain Event chits are removed from play after they have been revealed and their effects carried out.**

Some Event chits, noted as such in the News Summary, are not returned to the chit pool after one use. All other Event chits are returned to the pool after being revealed (they may occur more than once).

[6.5] **The News Summary explains all Opportunity and Event chits.**

See page 14.

[7.0] Spaceships

GENERAL RULE:

A complete spaceship includes a **hull** and a number of **pods.** Each hull possesses a sub-light engine, a bridge with navigation equipment, and crew quarters. A pod is a compartment, serving a specific function, that is attached to or enclosed in a hull. Specific attributes of a variety of hull and pod types are listed on the Spaceship Hull and Pod Characteristics Summary.

CASES:

[7.1] **Each hull type is rated for the following attributes:**

Pod Capacity. The maximum number of pods that may be attached to it at any time.

Interception Rating. A measure of the ship's ability to engage in high-acceleration maneuvers. Used when attempting to intercept an enemy ship and when attempting to avoid enemy interception.

Crew. The number of 5-man crew groups required to operate the hull.

Combat Strength. A quantification of the quality of the hull's weaponry.

Protection Rating. A quantification of the hull's armor and forcefield quality.

Cargo Capacity. The number of cargo units the hull may hold. An **N** indicates that the hull may carry any amount of monopoles, spice and tempus only.

The cost (in HT's) to purchase and repair the hull is also listed.

[7.2] **The Piccolo, Flute, Corco Gamma, and Dagger hulls are streamlined.**

A streamlined hull can function in a planet's atmosphere. Thus, **2** is added to the dice roll during a Smuggling Check (see 16.0).

[7.3] **The Dagger, Sword, and Spear hulls are military hulls, and illegal.**

Illegal Hulls (and pods) may be acquired only through an Opportunity chit or from another player. A spaceship with an illegal hull (or pods) may not enter a Spaceport with a Law Level of 3 or 4, and may be repaired only at Tau Ceti Spaceport.

[7.4] **Each pod type is rated for the following attributes:**

Combat Strength. Added to the Combat Strength of the hull. Four pod types have two Combat Strengths. The first is its normal Combat Strength (when not using missiles). The second (parenthesized) is its Missile Combat Strength.

Crew. The number of crew groups required to operate the pod.

The cost (in HT's) to purchase the pod is listed. All pods cost **10** HT's to repair.

[7.5] **The Hunter, Heavy Weapons, Arsenal, and Battle Comm Pods are military, and illegal.**

[7.6] **The following pods have special attributes:**

Augmented Jump. Increases the Hyperjump Chance by **2**. Every hull in *StarTrader* has a Standard Jump Pod. Thus, adding an Augmented Jump Pod to a hull does not count against its pod capacity (it replaces the standard one).

Cargo. Holds **2** cargo units.

Passenger. Holds **2** passenger (or **2** slave) groups.

Battle Communications. Used to jam enemy radar and communications and to track enemy ships. Increases hull's Interception Rating by **1**. Adds **2** to dice roll during Federal Patrol Check. Adds **3** to dice roll during Smuggling Check. Prevents Reputation Level reduction when intercepting.

[7.7] **The Summary of Spaceship Hull and Pod Characteristics lists the major attributes of all hull and pod types.**

See Display Sheet.

[7.8] **Damaged hulls and pods may be repaired at any Spaceport that has a Shipyard.**

Any amount of damage to a hull or pod can be repaired in a single Investment Phase by paying the requisite amount. An illegal hull or pod may be repaired *only* at the Tau Ceti spaceport.

[8.0] Building Spaceships

GENERAL RULE:

Players may receive spaceships at the beginning of play, per scenario instructions. Spaceships may also be purchased during play at any Spaceport with a Shipyard.

PROCEDURE:

During the Investment Phase, a player decides what hull (and pods, up to the hull's pod capacity) he wishes to purchase, chooses the class of crew that will man the ship, and pays for all this immediately. He then fills out a spaceship record (on the Player Log) and places a spaceship counter in any Shipyard. The spaceship is moved from the Shipyard to the Spaceport in the same System during the Investment Phase of the following Game-Turn. While in a Shipyard, a ship may not be used for any purpose. The sections of a spaceship record are filled out as follows:

- The Spaceship Number matches that on the counter. Any spaceship counter not currently in play may be used.
- The Hull type, Protection Rating, and Intercept Rating are taken directly from the Summary of Characteristics. If the spaceship has a Battle Comm Pod, increase the Interception Rating by **1**.
- The Cargo Capacity equals the rating of the hull plus **2** for each attached Cargo Pod.
- The Passenger Capacity equals twice the number of attached Passenger Pods.
- Two Combat Strengths are noted. The normal Combat Strength equals the sum of all unparenthesized Combat Strengths of the hull and pods. The Missile (parenthesized) Combat Strength equals the sum of all parenthesized Combat Strengths of the pods.
- The number of Crew Groups noted equals the sum of that for the hull and all the pods. The chosen Crew Class is on the other side of the slash.
- The names of all the chosen pods are noted.
- The Damage space is only used when the ship sustains damage; ignore it in filling out the record.

CASES:

[8.1] **An illegal hull or pod may be purchased only as the result of an Opportunity chit or from a player.**

New illegal ships are placed in the On Planet box upon purchase. They may be used immediately upon purchase.

[8.2] **A hull or pod may not be purchased unless it and its crew are paid for immediately.**

[8.3] **A hull may carry any number of pods, up to its listed pod capacity.**

A hull may be purchased without any pods, and pods may be purchased in subsequent Game-Turns. A spaceship need occupy a Shipyard only when its hull is first built; any subsequent pod additions or replacements do not require a turn in the Shipyard. Pods may be traded between spaceships in the same Spaceport at any time. Legal pods may be stored in a warehouse; a stored pod equals **5** cargo units.

[8.4] **Pods and hulls may be sold in any Spaceport.**

Pods and hulls may always be sold or traded among players for whatever price is agreed upon. Additionally, a player may sell a pod, hull, or entire spaceship to the market during the Investment Phase. To do so, he rolls **3D**, subtracts the Spaceport Class, and multiplies the result by **10** to determine the *percentage* of the item's list price that he receives. The player makes one roll for all the items he wishes to sell in a single Spaceport in one Investment Phase. Once he rolls the dice, he must sell all the items declared, even if the price is not to his liking. Spaceship crews and commodities aboard a ship are not sold in this manner (crew bounty may not be recouped when selling a ship to the market in this manner; the crew is lost).

[8.5] **Illegal pods and hulls may be sold only On Planet.**

The procedure for selling illegal spaceships to the market is identical to that detailed in 8.4.

[8.6] **Every spaceship must have a crew.**

There are four Crew Classes: **A**, **B**, **C**, and **D**. Crew Class modifies the chance of a successful hyperjump (9.4), and may modify a ship's Rating (10.1). Each crew costs a specific bounty to purchase. Whenever a spaceship is purchased, the purchasing player must hire a crew. He chooses the Crew Class he desires and pays a number of HT's equal to the bounty listed on the Crew Chart times the number of crew groups his ship requires. The bounty is a one-time charge. However, if the pods on a spaceship are changed, increasing the number of crew groups required, additional bounty equal to the crew group increase times the bounty for the same Crew Class must be paid immediately. If the number of crew groups required decreases, no rebate is received.

[8.7] **The Crew Class of a ship in a Spaceport may be improved by paying a new bounty.**

Paying a new bounty represents hiring a new crew. The total HT cost is calculated as in 8.6. No rebate for bounty previously paid is received.

[8.8] **The players may agree to pay crew salary throughout the game instead of bounty (Optional Rule).**

If this option is chosen, no bounty is paid upon spaceship purchase. Instead, each player must pay salary to the crew of each of his spaceships during every Investment Phase. The salary of a spaceship's crew equals that listed for the appropriate Crew

Class on the Crew Chart times the number of crew groups in the ship. Salary need not be paid for a new spaceship crew until the first Game-Turn that the ship leaves a Spaceport or an On Planet box; it then must be paid every Game-Turn. If a player does not pay the requisite salary for a spaceship's crew, the crew is immediately lost, and the player loses **2** Reputation Points. If a spaceship is On Planet or in a System Space box when its crew is lost, the ship (and all aboard) are lost.

[8.9] **The Crew Chart lists bounties and optional salaries for all Crew Classes.**

See Display Sheet.

[9.0] Hyperjumping

GENERAL RULE:

During the Hyperjump Phase, every spaceship may attempt to move to any box in any System. If a ship enters a System Space area occupied by enemy ships, the enemy player may check for interception. If a ship jumps into an On Planet box, the owning player must conduct a Smuggling Check (16.0).

PROCEDURE:

Players take turns moving their ships (Turn Order) by picking them up and declaring which System and area (Spaceport, System Space, or On Planet) each is moving to. Each player completes the moves of all his ships before the next player begins. Whenever a ship is moved to a different System, the player rolls **2D** and compares the result to the Hyperjump Chance listed for the destination System. The Hyperjump Chance may be increased, depending on the quality of the ship's crew or if it possesses an Augmented Jump Pod. If the dice result is equal to or less than the modified chance, the jump is successful; if the result is greater than the chance, the ship is not moved and its counter is inverted. If a ship is moving between boxes in the same System, no roll is necessary (unless entering an On Planet box, in which case a Smuggling Check must be conducted).

CASES:

[9.1] **A player with a ship in a System Space box must declare if he is attempting to intercept as soon as an enemy ship arrives in the System.**

He may not wait to see what other moves are made, and he may not attempt to intercept a ship leaving any box in the System. If more than one player has a ship in a System Space box, the players declare in Turn Order. If no player attempts interception, the incoming ship may proceed to the Spaceport or On Planet box (or may itself remain in the System Space box).

[9.2] **A spaceship that fails a hyperjump is inverted and may not be used at all for the remainder of the Game-Turn.**

It remains at its point of origin. No commodities, passengers, agents, or pods may be removed from the ship or placed aboard the ship. It participates in no game functions for the rest of the turn. At the end of the Game-Turn, the counter is re-inverted to its front.

[9.3] **Certain Spaceports possess a Safe Berth box.**

Any time a spaceship enters such a Spaceport, the owning player may pay **5** HT's and place his ship in Safe Berth. A spaceship already in a Spaceport may be put in Safe Berth (at a cost of **5** HT) during the Hyperjump Phase. A spaceship in Safe Berth may not be sabotaged; in all other respects, the ship is considered to occupy the Spaceport. Five HT's must be paid each Game-Turn (during the Hyperjump Phase) that a player wishes to keep a ship in Safe Berth. Any number of spaceships may occupy a Safe Berth.

[9.4] **The Hyperjump Summary lists all the modifiers that may increase the Hyperjump Chance.**

See Display Sheet.

[10.0] Interception and Combat

GENERAL RULE:

During the Hyperjump Phase, a spaceship in a System Space box may attempt to intercept an enemy spaceship(s) hyperjumping into the System. If interception occurs, combat may be initiated by either spaceship.

PROCEDURE:

When a spaceship hyperjumps to a System, all players with ships in that System Space box declare (Turn Order) whether or not they are attempting to intercept the incoming ship. The intercepting and incoming players each roll a die, adding the highest Interception Rating of any one of his ships in the System Space box to his roll. If the incoming player's total is higher than each of the intercepting players' totals, the incoming ship is placed in the Spaceport, On Planet, or System Space box (owning player's choice). If the incoming player's total is equal to or less than the intercepting players' totals, the incoming ship must stay in the System Space box, and combat may occur. The involved players declare (Initiative Order) whether or not they are firing on one another. If neither chooses to fire, combat does not occur (although at any point in the Phase that another ship enters the System Space box or during any other Hyperjump Phase, the players have additional opportunity to declare fire). The first player to declare fire conducts the fire; after resolving the fire, combat is conducted in Combat Rounds. In each Combat Round, the players have their ships fire (Initiative Order) using the following procedure:

1. The firing player declares which ship in the System Space box each of his ships is firing at and whether he is conducting **normal** or **missile** fire.

2. For each firing ship, he rolls **1D** and adds the ship's normal or missile Combat Strength (as declared) to the die result.

3. The modified die result is cross-referenced with the Protection Rating of the target ship to find the number of hits the target ship receives. If missiles were used, the firing player rolls **1D** again; if this second result is equal to or less than the number of hits the target incurred in that Round, the target ship is completely destroyed. Otherwise, the hits are immediately applied to the target ship as damage (see 11.0).

After all of one player's ships have fired, the next player may fire with any of his surviving ships, etc. This procedure continues for any number of Combat Rounds until no participating player is both willing and able to continue fire.

CASES:

[10.1] **The Interception Rating of a spaceship equals that of its hull, with the following modifiers:**

+1 if the ship has a Battle Comm Pod
+1 if the ship has a Class A crew
−1 if the ship has a Class D crew

[10.2] **A ship voluntarily moved into a System Space box automatically intercepts any ships already in the box.**

Any ships voluntarily in a System Space box have intercepted each other; they may, at their option, have combat.

[10.3] **During the Inquiry Phase, federal patrol sweeps may force each ship in a System Space box to leave.**

Each player with a spaceship in a System Space box must roll **2D** for each ship. If the dice result is equal to or less than the System's Patrol Value, the spaceship must be immediately moved to the Spaceport box. If the ship is illegal and the Spaceport's Law Level is **3** or **4**, the player must attempt to land it On Planet in the System (16.0). If a legal or illegal ship is forced to move by a Patrol Sweep, the owning player immediately loses Reputation Levels equal to the dice result. If the dice result is greater than the Patrol Value of the System, nothing happens to the ship, and no Reputation is lost. If a spaceship has a Battle Comm Pod, **2** is added to the dice result. Note that Mu Herculis has no Patrol Value; if an event calls for increases to Patrol Values, increase Mu Herculis' Patrol Value from **0**.

[10.4] **Combat can occur only between ships occupying the same System Space box.**

A player is never required to fire with any of his ships, even if he is fired on by another player's ship. If a spaceship that has unsuccessfully attempted to avoid interception is involved in combat without being destroyed, it may leave the System Space box and go to the System's Spaceport or On Planet box in the same Hyperjump Phase.

[10.5] **Fire is conducted and hits are applied one ship at a time.**

Each ship may fire at only one target during a given Combat Round, but may fire any number of times during an entire Attack Segment. Each ship fires independently of other ships (even those firing at the same target in the same Round). Combat is not simultaneous. A ship damaged during a Combat Round may have a reduced Combat Strength if it fires later in the Round (or it may not be able to fire at all). A player with more than one ship in a combat may see the results of one ship's fire before committing the fire of another ship.

[10.6] **A player may lose Reputation when he conducts interception or combat.**

When a player attempts interception of an incoming ship that does not wish to be intercepted, he must roll **2D** to find how many

Reputation Points he loses. (**Exception**: If the intercepting ship has a Battle Comm Pod, this roll is not conducted.)

When a player fires at a ship that attempted to avoid interception, he must roll **3D** to find how many Reputation Points he loses (a Battle Comm Pod does not prevent this roll).

[10.7] **The Combat Results Table is used to resolve each fire.**

See Display Sheet.

[11.0] Damage and Salvage

GENERAL RULE:

Results on the Combat Results Table are expressed in terms of hits. When a ship receives hits, the owning player must allocate them among the ship's hull and pods as damage. A pod is *damaged* when it receives its first hit, and it is *destroyed* when it receives its second hit. A hull can receive a number of hits up to its Protection Rating without being impaired. When the number of hits a hull receives exceeds its Protection Rating, it is destroyed.

CASES:

[11.1] **Spaceship damage is always allocated by the owning player.**

All damage must be allocated, and no more than **2** hits may be allocated to any single pod.

[11.2] **A hull suffers no disability from being damaged, but if destroyed, the entire ship is destroyed.**

Thus, a ship with a Protection Rating of **3** could take up to **3** hits to its hull without suffering harm. The hull would retain these hits until repaired (see 7.8). A fourth hit to the hull would destroy the entire ship. If a ship is destroyed, its counter is removed from the map, and its ship record is crossed out. Any commodities aboard the ship should be set aside until the end of combat in case salvage is attempted.

[11.3] **If a pod is damaged, it no longer has any effect on play.**

It no longer contributes toward the ship's Combat Strength, cargo capacity, etc. (until the pod is repaired; 7.8). If a damaged pod takes another hit, or if an undamaged pod takes two hits, it is destroyed; erase it from the ship record. If damage to a pod or pods reduces a ship's cargo capacity to the point where it cannot carry all the commodities aboard, the owning player must remove excess commodities from the ship (set them aside for possible salvage). A player suffers no special penalty if a Passenger pod (occupied or unoccupied) is damaged or destroyed.

[11.4] **Cargo from destroyed or damaged hulls and pods may be salvaged during the Salvage Segment.**

When a ship's cargo capacity is reduced, excess commodities are placed aside. Commodities aboard whole ships that are destroyed are also placed aside. (**Exception**: Cargo aboard a ship that was destroyed by missiles is removed from play; it may not be salvaged.) Once all stray cargo has been assembled after a combat, **2D** is rolled for each type of commodity present; **2** is subtracted from the roll, and the modified result is multiplied by **10**. This is the percentage of that type of commodity that can be salvaged (round fractions up). **Example**: A ship carrying **5** units of Spice is destroyed. A **2D** roll results in a **6**, which means that **40%** — or **2** units — of the Spice may be salvaged.

[11.5] **Any ships that participated in a battle may salvage any commodities for which they have cargo capacity.**

A player may "dump" commodities from his ship in order to make room for salvage. Players can transfer commodities among their ships occupying the same System Space box during any Salvage Segment. If more than one player's ships are capable of taking salvage, the players choose their salvage in Initiative Order.

[12.0] Trade

GENERAL RULE:

Commodities may always be sold or exchanged among players at whatever terms are mutually agreeable. The largest volume of trade any player conducts, however, will usually be with System markets in Monopoles, Spice, Isotopes, and Alloys. Every commodity that has a market in a System has a Supply/Demand (S/D) Modifier (printed on the Commodity Price marker). The current price of every commodity is noted on each System's Price Track.

PROCEDURE:

During each Bid Phase, each player secretly writes down what trades he will be interested in conducting in System Monopole, Spice, Isotope, and Alloy markets, noting the System, commodity, whether he wants to buy or sell, and the price he is offering or seeking. (**Example**: A player may write "Buy Gamma Leporis Alloys at 16" as part of his orders for a turn.) The players' orders are then set aside until the Transactions Phase, at which point they are all revealed. The following sequence is then performed for *every commodity at each System:*

1. Roll **2D**, adding the result to the commodity's S/D Modifier. The S/D marker is then placed in the S/D Index space on the Supply/Demand Track corresponding to this total.

2. If there were no bids to buy or sell the commodity in the System, the Price Modifier on the Track is noted, and the commodity's price is modified accordingly (**Example**: If the S/D marker was on the **+3** box of the Track, the commodity's price would go down by **1**.) Players then move on to handle the next commodity. Otherwise, Step 3 is performed.

3. ***If the S/D marker is at 0 or higher:*** The player who bid the greatest amount to *purchase* has the option to buy the commodity. The amount he may buy is calculated as follows: The commodity's current price is subtracted from the amount offered, and the box furthest *to the left* on the S/D Track with a Price Modifier corresponding to that difference is located. If the S/D marker is to the *left* of (or occupies) that box, none of the commodity may be purchased by the player. If the S/D marker is to the *right* of that box, however, **1** unit of the commodity may be purchased for each position the S/D marker is to the right of the box. For every unit the player chooses to buy, he pays the amount he bid, and the S/D marker is moved one position to the left.

If the S/D marker is at less than 0: The reverse procedure applies; the player who offered to *sell* at the *lowest* price has the option to sell the commodity in question. The amount he may sell is calculated as follows: The commodity's current price is subtracted from the amount the player wants for each unit, and the box furthest to the *right* on the S/D Track with a Price Modifier corresponding to the difference is located. If the S/D marker is to the *right* of (or occupies) that box, none of the commodity may be sold by the player. If the S/D marker is to the *left* of that box, however, **1** unit of the commodity may be sold for each position the S/D marker is to the left of the box. For every unit the player chooses to sell, he receives the amount he offered to sell for, and the S/D marker is moved one position to the right.

This step is performed once for each bid placed by a player for the commodity at the System in question.

Example:

COMMODITY: Monopoles at Mu Herculis (S/D Modifier of **−4**). The current price is **13**.

Three players announce bids that they have previously noted on their Player Logs.

BIDDERS: Player **A** bids **12** to **buy**. Player **B** bids **16** to **buy**. Player **C** bids **10** to **sell**.

The dice roll is **10** *which, added to the S/D Modifier of* **−4**, *results in* **+6**. *The S/D marker is moved to the* **+6** *space of the Supply/Demand Track. Since the S/D marker is at greater than zero, the player with the highest bid to buy (player* **B**) *goes first.*

PLAYER B: Bid of **16**, minus current price of **13**, is **+3**. The farthest space to the **left** with a Price Modifier of **+3** (the **−8** space) is **14** spaces from the current position of the S/D marker (in the **+6** space). Player B may buy a maximum of **14** units. He buys **7** units at a cost of **112** HT's (**7** times his bid of **16**), and the S/D marker is moved **7** spaces to the **left**, to the **−1** space.

Because the S/D marker is now at less than zero, the player bidding lowest to sell (player **C**) *has an opportunity to trade.*

PLAYER C: Bid of **10**, minus current price of **13** is **−3**. The farthest space to the **right** with a Price Modifier of **−3** (the **+10** space) is **11** spaces from the current postion of the S/D marker (in the **−1** space). Player C may sell a maximum of **11** units. He sells **3** units at a price of **30** HT's (**3** times his bid of **10**), and the S/D marker is moved **3** spaces to the **right**, to the **+2** space.

Player **A** *cannot buy Mu Herculis Monopoles on this turn, because his bid of* **12**, *minus the current price of* **13**, *is* **−1**; *the space farthest to the* **left** *with a Price Modifier of* **−1** *is the* **+2** *space, and that space is currently occupied by the S/D marker. Trade in Mu Herculis Monopoles is ended for this turn.*

PRICE ADJUSTMENT: Now that trading for Mu Herculis Monopoles has ended for the turn, the Price Modifier — taken from the space occupied by the S/D marker at the end of trade — is applied to the commodity's price. The Modifier is **−1**, so the price of drops from **13** to **12**.

4. After all purchases and sales have been completed, the commodity's price is altered by the Price Modifier in the box currently occupied by the S/D marker. (In the example of Step 3, the price would be reduced by **1**.) Current prices are adjusted by moving the commodity's Price marker on the System's Price Track.

CASES:

[12.1] **A player need not have a spaceship or warehouse in a System in order to bid there.**

However, if a player bids to buy and then it is possible for him to buy, he must purchase at least one unit. If he has no place to store the purchased unit, it is immediately lost. If a player bids to sell and it is then possible for him to sell, he must sell at least one unit, unless he has no units of that commodity in that System (in which case this restriction is ignored). No player can bid to both buy and sell the same commodity in the same System on a given turn. Legal commodities purchased may be placed in a spaceship in a Spaceport or in a warehouse. Legal commodities aboard a spaceship in System Space or On Planet may not be sold.

[12.2] **A commodity's price can never go above 20 or below 1.**

Players may not offer to buy or sell a commodity at a price higher than **20**, or lower than **1**. In addition, if any Price Modifier (of any sort) would push a commodity's price above **20** or below **1**, the modifier pushes the price only *to* **20** or **1** (respectively), and no further.

[12.3] **If more than one player bids the same amount to perform the same transaction, the player with higher Initiative has the first option.**

[12.4] **If all buyers have been given the option to purchase a commodity, potential sellers may attempt to sell the commodity, even if the S/D marker is at or above 0.**

This is an exception to Step 3 of the Procedure. The same applies in the reverse situation. If all sellers have been given the option to sell a commodity, potential buyers may attempt to buy it, even if the S/D marker is below **0**. Such purchases are still conducted in order of the highest bid first, and sales are still conducted in order of the lowest bid first.

[12.5] **Transactions may never be conducted that would push the S/D marker beyond −18 or +18.**

A player could not, for instance, sell **8** units of a commodity if the S/D marker was at **+15**, regardless of the amount he offers; the most he could sell would be **3** units.

[13.0] Market Positions

GENERAL RULE:

A player who trades in large volumes at a particular market will develop advantages over other players who are not as experienced in that market. Such an advantage is called a **market position**. There are three ranks of market position: Dealer, Contractor, and Market Manager.

PROCEDURE:

Whenever a player buys or sells **6** or more units of a legal commodity in a single transaction at a particular market, there is a chance that he will gain a market position. The player rolls **2D**. If the total is less than or equal to the amount of units involved in the transaction, the player immediately rises one rank in market position (from nothing to Dealer, from Dealer to Contractor, or from Contractor to Market Manager). A player's market position should be noted on the appropriate System Display. A Market Manager may gain no further rank in that commodity in that System. **Note**: A player is never forced to rise in market position.

CASES:

[13.1] **No more than one market position rank may be gained by a player in any one commodity in a System in a given Game-Turn.**

[13.2] **No more than one player may be the Market Manager for a particular commodity at a System at one time.**

If a Contractor would, by the normal procedure, rise to Market Manager rank, but there is already a Market Manager for the commodity in the System, instead of the Contractor rising in rank, the Market Manager falls to Contractor Status. Any number of players may be Dealers and Contractors in a particular market.

[13.3] **Whenever a player rises in market position, he immediately adds 1 to his Business Connection Level, adding the usual 2 Reputation Levels.**

[13.4] **The Dealer market position confers no special advantage.**

[13.5] **A Contractor has a special purchase/sale option.**

After all players' bids have been revealed *and executed*, and a commodity's price has been adjusted as a result of the Price Modifier on the S/D Track, a Contractor has the option to buy or sell up to **5** units at the current price. This option may be exercised only if the Contractor did not bid for the commodity earlier in the turn. Purchases or sales by Contractors utilizing this special option do *not* affect the prices of the commodities to which they pertain.

[13.6] **A Market Manager may examine all other bids before declaring his own.**

If a player is a Market Manager for a commodity in a System, he never needs to write a bid for the commodity in that System. At the beginning of the Transactions Phase, he examines the other players' bids (for the commodity at that System *only*), and declares any bid of his own. Regardless of whether or not a Market Manager bids for a commodity, he may use the Contractor's bonus ability.

[13.7] **A player may attempt to undermine another player's market position during the Opportunity Phase.**

To do so, the player must have higher Business or Political Connections than the player he is attempting to undermine. The player declares which specific market position and player he is attempting to undermine, and whether Business or Political Connections are being used. (**Example**: "Player C in Tau Ceti, Isotopes, with Business Connections.") He then expends **20** HT's and rolls **1D**. If the die result is less than the difference between the opposing players' Business or Political Connection Levels (whichever was declared by the underminer), the victim's market position is reduced one rank, and the victim's Reputation Level is reduced by **2**. If the die result is equal to or greater than the difference, the undermining player loses a number of Reputation Levels equal to the amount by which the result failed. (**Example**: If the Connection Level difference is **5** and a **6** is rolled, the undermining player loses **2** Reputation Levels.) A player may make no more than one market position undermining attempt per Game-Turn.

[14.0] Storage

GENERAL RULE:

Whenever a player buys commodities from another player or from a market, the units must be stored, either in a warehouse (if the transaction took place in a Spaceport) or in a spaceship (if the purchaser has one in the box where the transaction took place).

CASES:

[14.1] **A player may purchase one warehouse unit for 20 HT's.**

The purchase of such units is noted by placing a Warehouse marker of the appropriate denomination in the player's portion of any System's Warehouse Track. Once placed, warehouse units may not be transferred among Systems. They may be sold, traded, or loaned to other players, in which case the marker is moved to the new owner's portion of the Warehouse Track.

[14.2] **Every unit of warehouse capacity has a cargo capacity of 10 (equal to 10 units of ship cargo capacity).**

The presence of commodity units in a warehouse is noted by placing a Commodity chit corresponding to the appropriate denomination of the commodity beneath the Warehouse marker.

[14.3] **Each warehouse unit can hold 10 units of Alloys or Isotopes, and any quantity of Monopoles and Spice.**

Illegal commodities and pods may not be stored in warehouses. A Cargo Pod can hold **2** units of Alloys, Isotopes, or Weapons. Monopoles, Spice, and Tempus effectively take up no space, so long as some storage facility is available to store them. Thus, any ship may carry any quantity of these three commodities. These commodities may not be stored in a System's Spaceport box if there is no ship or warehouse at all to keep them in.

[14.4] **Commodities need not be stored during a Transactions Phase.**

A player may buy a commodity in excess of his capacity to store it in anticipation of selling some other commodity to make room for his purchase. Any commodity units that cannot be stored at the end of the Transactions Phase, however, are lost.

[14.5] **Commodities stored in a warehouse may be sold in the System's market or transferred to spaceships in the System's Spaceport (and vice versa) at any time.**

Commodities may not be transferred from an On Planet box to a Spaceport or warehouse, nor vice versa.

[14.6] **Pods may be stored in warehouses.**

Each pod stored in a warehouse reduces the warehouse's cargo capacity by **5**. Pods stored in a warehouse may be freely switched on and off ships in the System's Spaceport during any Investment Phase.

[15.0] Passengers

GENERAL RULE:

Ships may carry passengers, for profit, between Star Systems.

PROCEDURE:

The number of passenger groups wishing to go between any two Systems each Game-Turn equals the sum of both Systems' Spaceport Classes. During an Opportunity Phase, a player may declare aloud (Initiative Order) that he is transporting any or all of the available passengers. He immediately receives **5** HT's for each passenger group, but he must attempt to hyperjump to the Spaceport of the announced destination System in the next Hyperjump Phase. **Example**: A player wants to transport passengers from Beta Hydri to Epsilon Eridani. The sum of those Systems' Spaceport grades is **7**, and thus **7** passenger groups are available for transport. The player takes on **4**, immediately receiving **20** HT's. He also assumes the obligation to attempt to jump from Beta Hydri to Epsilon Eridani in the next turn. Another player could take the remaining **3** passenger groups.

CASES:

[15.1] **If a spaceship that takes on passengers fails to arrive in the Spaceport of the destination System, the ship's owner immediately forfeits *twice* the amount of HT's he claimed in taking on the passengers.**

If he has insufficient assets, he loses all assets he has, ignoring the excess.

[15.2] **A ship may take on 2 passenger groups per undamaged Passenger Pod.**

[15.3] **A player may never take on passengers (including those offered by Opportunity chits) if his Reputation Level is below 15.**

[16.0] Smuggling

GENERAL RULE:

A player will frequently be able to realize his largest profits through smuggling illegal commodities, although a substantial risk is involved in such transactions. Illegal commodities may be purchased and sold only in On Planet boxes. Whenever a player declares that one of his ships is entering a System's On Planet box, the owning player must conduct a **Smuggling Check** to determine whether or not the ship is intercepted by federal authorities. Illegal commodities may be introduced to the game only through Opportunity chits. The prices of illegal commodities are determined by the Black Market Table, not the normal trade procedure.

PROCEDURE:

Whenever a ship enters a System's On Planet box, the owning player rolls **2D**; the player adds **3** to this roll if the ship has one or more undamaged Battle Comm Pods, and **2** is added if the ship is streamlined. If this modified roll is greater than the System's Security Rating, the ship arrives safely; if the roll exactly equals the total, the ship is instead placed in the System's Spaceport, in which case the owning player immediately loses **2D** from his Reputation Level and loses any illegal commodities (including slaves) aboard the ship — they are considered jettisoned. Any illegal hulls or pods are also lost. If the modified roll is less than the System's Security Rating, the ship is lost with all cargo, and the owning player loses **3D** from his Reputation Level.

Whenever illegal commodities are introduced, the following information is provided: the System On Planet box in which the commodity is available; the price at which it is available; and where the commodity is to be sold. Once an illegal commodity has been transported to its destination System's On Planet box, the owning player rolls against the Black Market Table during any Opportunity Phase to determine the price he receives.

CASES:

[16.1] **Up to 10 units of an illegal commodity may be purchased each time it is offered by a chit.**

[16.2] **An illegal commodity may only be sold to the black market when On Planet in the destination System listed in the opportunity.**

During the Opportunity Phase, the owning player rolls **1D** and refers to the Black Market Table to find how many HT's per unit he receives for the illegal commodities. Once he uses the Black Market Table, the player *must* sell all he has of the commodity to the black market at the listed price.

[16.3] **Illegal commodities may be sold or traded among players.**

This may be done only if both players have spaceships in the same On Planet box. If units of a specific illegal commodity are split between two players, subsequent sale of that commodity to the black market is handled as if only one player possessed the commodity. That is, the price derived from the Black Market Table by the player who first sells his portion of the commodity must be accepted by all other players who wish to sell their portion.

[16.4] **The sale of illegal pods and hulls uses the procedure described in 8.4.**

[16.5] **If a ship with an illegal hull or pods is attempting to enter an On Planet box and receives a jettison result, the entire ship is confiscated.**

[16.6] **Black Market Table**

See Display Sheet.

[17.0] Agents

GENERAL RULE:

Players begin a number of scenarios with special agents. Players can also acquire new agents during an Opportunity Phase. Each agent has a special effect on play, detailed on the Agent Chart.

PROCEDURE:

A player may declare that he is attempting to acquire an agent once during each Opportunity Phase. He then states the amount of money he is willing to spend to acquire the agent and rolls **2D**; if the roll, multiplied by **5**, is less than or equal to the amount stated, the player picks an agent *at random* from those remaining in the agent pool. If the roll is higher than the amount stated, he may not draw an agent. In either case, the player expends the amount he has declared.

CASES:

[17.1] **Agents may be traded or loaned among players.**

[17.2] **At any given time, an agent must be in a specific location.**

He can be aboard a ship (indicated by placing him beneath the ship's counter), in a Spaceport, or On Planet. An agent may not occupy a System Space box unless he is aboard a ship.

[17.3] **Agents may be transported between locations.**

An agent takes up no cargo or passenger space. He may be carried aboard any ship.

[17.4] **If an agent is aboard a ship that is destroyed, he is killed.**

He may never return to play, and he is kept separate from the pool of agents available. As long as an agent is in play, he may be used as often as eligible.

[17.5] **Each agent has an individual special ability.**

The Agent Chart lists each agent's name and his special effect on play (along with any requirements which must be fulfilled before he may be used).

[17.6] **Agent Chart**

See Display Sheet.

[18.0] Loans

GENERAL RULE:

During the Investment Phase, players may take out loans from the federation-wide *Bank of the Federation*. Interest must be paid on such loans. A player may have only one loan outstanding at any time.

PROCEDURE:

A player states that he is taking out a loan, and declares the amount of the loan and whether it will be outstanding for **4** or **8** Game-Turns. The amount of interest he will be charged per turn is calculated by subtracting the player's Reputation Level from the amount of the loan; if the loan is for **4** turns, this difference is divided by **20**; if the loan is for **8** turns, the difference is divided by **10**. The resulting quotient is the interest payment of the loan. Fractions are rounded to the nearest whole number. Each Investment Phase, the player with a loan outstanding has the option of paying back the loan in full, or paying the interest.

CASES:

[18.1] **The maximum amount that a player may take out as a loan is calculated by adding:**

100 per ship owned, plus
20 per warehouse unit owned, plus
20 per production unit owned, plus
current assets recorded on the Asset Track.

[18.2] **Interest on a loan must be paid each Investment Phase.**

If a player is unable to pay interest due, his Reputation Level is reduced by **4**, and the amount of the interest is added to the amount of the loan (future interest payments do not increase).

[18.3] **Loans may be taken out for terms of 4 or 8 turns.**

[18.4] **A player must repay a debt on the turn it is due, or before.**

If a player does not have sufficient assets, he must immediately sell as many of his ships (8.4), warehouse units (at **20** HT's each), and factories (19.4) as are necessary to repay the loan. A ship that is not in a Spaceport may also be sold (as an exception to the normal ship sale procedure) at a flat fee of **50** HT's. Any commodities or agents aboard ships or stored in warehouses which are sold are lost. If a player still cannot pay back a loan after selling all his ships, warehouses, and factories, he loses the game.

[18.5] **The minimum interest payment on any loan is one HT per turn.**

If a player's Reputation Level were **40**, he would still pay **1** HT per turn interest on a loan of **20** HT.

[19.0] Factories

GENERAL RULE:

Players may purchase factories, which produce commodity units each Game-Turn.

PROCEDURE:

During an Investment Phase, a player declares that he is purchasing a factory to produce a particular commodity in a System. he then pays **10** HT's plus **5** times the commodity's current market price for each factory unit purchased. Such a purchase is noted by placing a commodity chit of the appropriate type and denomination in the purchasing player's Factory box in the System Display. Each Opportunity Phase following the purchase of factories, the player receives **1** unit of the commodity for each factory unit purchased.

CASES:

[19.1] **A player may purchase factories to produce only those commodities that are abundant in a System.**

[19.2] **When the produce of a factory is received, the owning player must dispose of it in some way.**

He may store it in a warehouse or in a ship in the System's Spaceport, or give or sell it to another player. Commodities may not be stored in factories, nor may they be sold to the market immediately following their production, until the ensuing Transactions Phase. If a player has insufficient storage capacity in a System and does not in some manner dispose of the produce, it is lost.

[19.3] **A player may never have more factory units on the Display than the total of his Business and Political Connection Levels.**

A player may voluntarily eliminate factories (if he is at his maximum and desires to build factories for another commodity, for instance).

[19.4] **Factories may be sold or traded among players.**

A player may also sell a factory to the market during the Investment Phase. To do so, he removes the factory or reduces it by the number of factory units sold and receives **5** HT's times the current price of the commodity produced per factory unit.

[20.0] Sabotage

GENERAL RULE:

Any spaceship occupying a Spaceport box, any warehouse, or any factory is vulnerable to sabotage by enemy players during the Opportunity Phase. Sabotage may result in a spaceship becoming damaged, a warehouse losing stored commodity units, or a factory being temporarily inoperative.

PROCEDURE:

A player wishing to sabotage an enemy spaceship, warehouse, or factory declares his attempt, pays **20** HT's times the System's Law Level, and rolls **2D** twice, adding his Criminal Connection Level to each roll. The first result is located in the Effect column of the Sabotage Table, to find the outcome of the attempt. The second result is located in the Reputation column of the table, to find how many Reputation Levels are lost by the saboteur.

CASES:

[20.1] **No more than one sabotage attempt may be made against a particular ship, warehouse, or factory in a single Game-Turn.**

There is no limit to the number of sabotage attempts a player may conduct in a single Game-Turn, however. A player need not have a spaceship in a System to attempt sabotage in that System.

[20.2] **Sabotage may not be attempted against a spaceship in a Safe Berth or Shipyard box.**

[20.3] **When attempting to sabotage a factory, the number of production units in the factory is subtracted from the first dice result.**

The dice result for Reputation loss is not modified for factory size.

[20.4] **The outcome of a sabotage attempt is applied to the target as follows:**

Spaceship. Apply the effect number to the spaceship as hits. The player owning the ship distibutes the hits as explained in 11.1. If a ship's cargo capacity is reduced as a result of sabotage, any commodity units stored in excess of the ship's reduced cargo capacity may be transferred to another spaceship or warehouse in the System. If the commodity units cannot be transferred, sold, or given away, they are lost; the saboteur may not attempt salvage.

Warehouse. Apply the effect number as the number of commodity units in the warehouse that are immediately destroyed. The saboteur may choose which specific commodity units are lost. The warehouse itself is not damaged by sabotage.

Factory. Apply the effect number as the number of consecutive Game-Turns during which the factory will produce no commodity units (including the current Game-Turn, even if the factory has already produced units). The player owning the factory should note the Game-Turn in which the factory will again produce on his Player Log. The factory itself is not damaged by sabotage.

[20.5] **Sabotage Table**

See Display Sheet.

[21.0] Reputation

GENERAL RULE:

Each player has a Reputation Level which fluctuates during the game as the players trade honorably or perform misdeeds. Having a good reputation will reduce the amount of interest a player pays on his loans, and will gain the player a cash bonus each Game-Turn. A player with a bad reputation runs the risk of stiff penalties, or even of losing the game.

D REP

PROCEDURE:

At various points during the game, the players will perform actions that modify their Reputation Levels, causing their Reputation markers to be advanced or retreated along the Reputation Track. The factors affecting reputation are summarized in the Reputation Table (21.7). During the Inquiry Phase, each player's Reputation Level is noted; players with Reputations of **5** or less may be investigated by federal authorities, while those with good reputations are financially rewarded.

CASES:

[21.1] **A player's Reputation Level fluctuates between 0 and 40.**

If a player's Reputation Level would rise above **40**, it stays in the **40** space and additional positive modifications are ignored. If a player's Reputation reaches **0**, the player's Reputation marker is placed in the **0** space. Once in the **0** space, the marker may not be advanced except as the result of an inquiry.

[21.2] **If a player's Reputation Level is at 5 or less at the beginning of an Inquiry Phase, he may have to undergo an inquiry.**

The player rolls **1D**. If the result is greater than his Reputation Level, he must roll **1D** again and locate this result on the Inquiry Table.

[21.3] **If a player's Reputation Level is between 1 and 19 (inclusive) during Segment C of an Inquiry Phase, 3 is added to his Reputation Level.**

(**Exception**: A player does not receive this increase if he has undergone an inquiry in the same Phase.) A player's Reputation Level may not be raised above **20** in this manner; if an additional **3** Levels would raise his Reputation to **21** or **22**, it rises only to **20**.

[21.4] **Several positions at the upper end of the Reputation Track have monetary benefits printed in them.**

If a player's Reputation Level ends the Inquiry Phase in a space listing a monetary benefit, the player immediately receives that number of HT's.

[21.5] **A player may attempt to improve his Reputation Level through the expenditure of HT's.**

During an Investment Phase, a player may pay **20** HT's to attempt to improve his Reputation Level. The player rolls **1D** and raises his Reputation Level by the result. If a **6** is rolled, however, no Reputation Levels are gained (although the HT's are expended). A player may do this only once per Game-Turn.

[21.6] **A player's Political Connection Level will influence the effects of inquiries conducted against him.**

If a player's Political Connection Level is **5** through **8** (inclusive), subtract **1** from rolls against that player on the Inquiry Table. If a player's Political Connection Level is **9** or **10**, subtract **2** from such rolls. One player (only) may also use his Political Connections to influence rolls made by another player on the Inquiry Table by the same amounts. If a player does so and any result other than acquittal results, he suffers the outcome listed on the table for supporting player. If the player against whom an Inquiry is conducted uses his Political Connections to influence a roll, no other player may do so.

[21.7] **Reputation Table**
See Display Sheet.

[21.8] **Inquiry Table**
See Display Sheet.

[22.0] Negotiation

GENERAL RULE:

Players are free to trade information, properties, assets, and agents. They may (and are encouraged to) strike any bargains that are agreeable to all concerned parties, so long as no rules are violated. Agreements may be either oral or written.

PROCEDURE:

Players may form an oral agreement simply by stating it out loud and declaring to the other players that it is an oral agreement. A written agreement is formed by actually writing out the terms of the contract and paying a contract fee. Both oral and written agreements may be violated, but players will lose Reputation Levels for doing so.

CASES:

[22.1] **A player who intentionally or unintentionally violates an oral agreement loses 1D Reputation Levels.**

[22.2] **A player who intentionally or unintentionally violates a written agreement loses 10 Reputation Levels.**

[22.3] **A Contract Fee of 10 HT's must be paid when a written contract is formed.**

The participating players may split payment of this fee as they see fit. Players may build escape clauses into written contracts to avoid the harsh strictures of 22.2. **Example**: A contract might have the following term built into it: "Either party to this contract may declare this contract null and void by paying 40 HT's to the other party."

[22.4] **Any form of agreement (oral or written) may be suspended if all parties to the agreement concur.**

Bribes may be offered, threats invoked, etc., to influence recalcitrant players.

[22.5] **Commodity units may be exchanged among players only if each recipient has sufficient storage capacity at the place of exchange.**

Commodities on a ship in a System Space box may not be transferred to another player's warehouse, for example. Money and information may always be transferred, however, and require no transportation at any point during a turn. Commodities, warehouses, agents, and other properties may be transferred between players only during a Transactions, Opportunity, or Investment Phase, respectively.

[22.6] **Players are only required to reveal information recorded on their Player Logs when necessary to perform a game function.**

A player is not required to state what pods or hull is on a ship unless he wants to use them (for example, a player would not have to declare what weapons pods were aboard a ship until he wanted to fire on another player).

Exception: Each player's Connection Levels are always known to each of the other players.

[23.0] Scenarios

GENERAL RULE:

StarTrader may be played in a number of different scenarios, divided into two broad categories: **free-deployment** and **corporate**. In a free-deployment scenario, all players begin the game with one spaceship and equal assets. In a corporate scenario, each player represents a corporation with specific attributes and a selection of potential goals. Each scenario may be played with two to six players, although special rules in 23.7 must be used in a two-player game. Before beginning the game, the players agree on a scenario to play, set up the necessary counters, and each fills out a Player Log.

CASES:

[23.1] **The players prepare for a free-deployment game as follows:**

- Each player chooses an Asset Track and a player color and sets up his Asset markers at 300 HT's.
- Each player receives a spaceship composed of a Clarinet hull with three Cargo Pods, one Passenger Pod, one Light Weapons Pod, and one Augmented Jump Pod, manned by a Class B crew. Each player chooses a ship counter, places it in any Spaceport, and fills out a ship record on his Player Log (see 8.0).
- Each player rolls **2D**. The result represents the sum of all his Connection Levels. He secretly assigns these among Business, Political, and Criminal Connections on his Player Log in any way he chooses. Once all players have chosen their Connection Levels, they are revealed for all to see.
- Place the Game-Turn marker in the first space of the Game-Turn Record Track and the S/D marker in the **0** space of the S/D Track. Place each player's Reputation marker in the **20** space of the Reputation Track. Place each Price marker (there are **18**) on the Price Track of the various Systems, in the spaces keyed on the Tracks themselves.

[23.2] **The free-deployment scenario may be played with one of two types of Victory Conditions.**

Before beginning the game, the players agree they will play until one player has accumulated **1000** HT's in assets, or until a set number of Game-Turns have elapsed.

If the first option is chosen, the game ends when a player has **1000** HT's recorded on his Asset Track at the end of any Inquiry Phase; he is declared the winner. The principal of a loan a player has outstanding is subtracted from his assets when checking for victory. A game takes from **5** to **8** hours to complete with this Victory Condition.

If the second option is chosen, the players agree upon a Game-Turn that they will stop play. The player with the most HT's indicated on his Asset Track at the end of that turn is the winner. All loans must be paid back on the last Game-Turn, and the players may sell all their commodities and spaceships during the normal course of that turn to increase their assets for victory purposes. Keeping in mind that a single Game-Turn takes from **15** to **30** minutes to complete (depending on the number of players), the players may make the game as long as they wish when using this Victory Condition.

[23.3] **The players prepare for a corporate scenarios as follows:**

- Each player rolls **1D**. The player with the highest roll then rolls **2D** and locates the corporation that he will play corresponding to the dice roll in 23.6. The other players then roll **2D**, in order of their first die roll, to find which corporation each of them will play. If a player rolls a corporation already assigned to a player, he rolls again.
- Each player places counters on the map and fills out his Player Log according to his corporation description. He places his Reputation marker, notes his Connection Levels on his Log, and places his Asset markers. If he has any market positions, factories, or warehouses, he places counters to show them. For each spaceship he is assigned, he selects a spaceship counter, places it where instructed, and fills out a ship record. If he receives an agent, he selects the appropriate counter and places it where instructed.
- Certain corporations have special rules governing their play. These should be announced to all players.
- Place the Game-Turn marker in the first space of the Game-Turn Record Track and the S/D marker in the **0** space of the S/D Track. Place each Price marker in the space marked with its commodity on the Price Track in the various Systems.

[23.4] **The Corporation Table may be used to determine a set selection of participating corporations in a corporate scenario.**

Use of this Table is optional. It replaces the **2D** roll each player conducts to determine his corporation and provides the players with an interesting mix of corporate types.

[23.5] **When playing a corporate scenario, each player chooses his Victory Conditions secretly.**

Each corporation description lists two or three ways the player may win. Before beginning the game, he chooses one of the conditions and secretly notes its letter (A, B, or C) on his Player Log. If the player has fulfilled the chosen conditions at the end of any Inquiry Phase, he reveals his choice and demonstrates how the conditions have been fulfilled. The game is then over, and he has won. The principal of a loan a player has outstanding is subtracted from his assets when verifying victory. There is no set number of Game-Turns in a corporate scenario; play continues until a player achieves victory (usually in **6** to **10** hours of play).

[23.6] **The Summary of Corporations lists 11 coporations that players may represent in a corporate scenario.**

See page 14.

[23.7] **When only two players are in the game, the backside of all the price markers should be used.**

The backside of each marker has a different S/D modifier than that on the front. These modifiers are less drastic (closer to **−7**) and compensate for the lack of competitive bidding when only two players are involved.

[24.0] Using *StarTrader* in a *Universe* Campaign

GENERAL RULE:

There are two distinct ways in which *StarTrader* may be used in a *Universe* campaign. It may be used as a play aid, to help gamesmasters deal with the players' interstellar trading; and it may serve as a scenario generator. In the former case, one or more players are actually owners or lessors of one or more interstellar vessels, and are out to make a profit through trade; in the latter, the players are not involved directly with interstellar trade, and the GM uses *StarTrader* to provide background for the campaign.

PROCEDURE:

Whenever *StarTrader* is used in a *Universe* campaign, the GM must fill out System Displays for the Systems involved in the campaign. If players are actually trading, the GM converts their attributes and possessions into those used in *StarTrader.* The GM then uses (plays) *StarTrader,* moving and conducting transactions as indicated by the trading player and informing the player of the results of his decisions. If *StarTrader* is simply being used as a scenario generator, the GM plays the game himself (or with other persons who are not players in the campaign) and uses the information and events of the campaign to simulate interaction and activity on the part of the players.

CASES:

[24.1] **A Star System Display Master is included in these rules. When a new System is introduced, a photocopy of the master is filled out.**

Spaceport Class is the highest class of any Spaceport in the System (round up if a System's highest Spaceport Class is ½).

Law Level is the highest Law Level of any world or Spaceport in the System.

Security Rating is the sum of the Spaceport Class and Law Level, found above, plus 2.

Patrol Rating is the sum of the Spaceport Class and Law Level.

Commodities which are abundant anywhere in the system (see *Universe,* 25.7) should be so indicated in the On Planet box of the System. The GM must then decide what commodities will be traded; if players are actually trading, the players should take some part in the decision; otherwise the GM should simply choose four or five commodities that he thinks will be actively traded in the area of the campaign. The GM then determines whether or not there is a market for each commodity at each of the Systems in the game; if a commodity is abundant anywhere in a System it automatically has a market in that System; other commodities have a 50% chance of having a market at any System (plus 10% times the Spaceport Class); the price of each commodity at each System where it is traded is determined as follows: Multiply the commodity's price on the World Resource Table (25.7 of *Universe*) by 0.15 if the commodity's price on that table is per ton, or by 10 if the commodity's price is per gram or kilo; if the good is abundant, multiply this product by 50%; if limited, multiply the product by 75%; otherwise, do not multiply by anything. The Spaceport Class of the System is then added to the product. The commodity's price will then be anywhere within **2** (either direction) of the final quantity (GM's discretion).

Example: The GM has determined that silver is abundant at a System with a Spaceport Class of **3.** Silver is priced at **0.5** per kilo on the World Resource Table. Silver's price is thus **0.5** (basic price) *times* **10** (because it is traded in kilos) *times* **50%** (because it is abundant) *plus* **3** (Spaceport Class), for a total of **5.5.** Silver's price will fall within **2** of this amount (i.e., it will be **4, 5, 6,** or **7**), at the GM's discretion.

The S/D modifier for each commodity will be:

−10, −9 if not available at a System.
−6, −7, −8 if limited, measured in kilos or tons.
−5, −4, −3 if limited, measured in grams.
−2, −1, 0, +1 if abundant.

The GM determines the exact S/D modifiers within the spans given.

[24.2] **A player's possessions translate into *StarTrader* as follows:**

A player must have ships to trade; ships can be transferred directly, however — the pods and hulls in *Universe* are identical to those in *StarTrader* (a few new hull classes are added in the latter). The pod capacities of hulls are slightly lower in *StarTrader,* as Energy and Jump pods have been factored into hulls. Ship prices in *StarTrader* have also been rounded off because of the huge quantities of funds involved; the prices of illegal hulls and pods have been multiplied greatly to account for the assumption that they will always be purchased on the black market in *StarTrader.* Nevertheless, the hulls and pods themselves are the same. Ship records should be filled our for all ships using the Summary of Ship Hull and Pod Characteristics. The GM should determine the Crew Value of ship's crew involved.

Money in *StarTrader* is measured in HectoTrans (units of 100 *Universe* "Transfers", or about $50,000 to the HT); funds a player might invest should therefore be divided by 100 to convert to HT's.

Each point of Warehouse Capacity in *StarTrader* represents one large warehouse, and each factory unit represents facilities capable of producing 60 tons a year of goods measured in tons, 4 tons a year of goods measured in kilos, or 4 kilos a year of goods measured in grams.

Agents essentially represent very capable or influential persons. If a player, employee, or other NPC is particularly apt, his ability can be represented through an agent.

[24.3] **A player's attributes translate into *StarTrader* as follows:**

The GM should determine a player's Connection and Reputation Levels based upon the player's NPC contacts, the degree to which he is known and respected in the business community, and the levels of any appropriate skills. These include primarily Economics and Trading, and secondarily Diplomacy, Forgery/Counterfeiting, Law, Recruiting, Streetwise, and Mining. If a player has done nothing of particular note, his Reputation Level will be around 20. A Merchant or an Interstellar Trader may be provided with warehouses or even factories depending on his initial Benefit Level and activities previous to use in *StarTrader.*

[24.4] **A different procedure is used for hyperjumping when players or their ships are involved.**

Use the formula for calculating jump percentage in *Universe* (10.0, Navigation) rather than basing the number on Crew Value. Treat all results of **+30** or less on the Hyperjump Table (32.2 of *Universe*) as successful jumps (in *StarTrader* terms) and results of **31-50** as unsuccessful jumps. Results of **51+** should be handled as *Universe* events, rather than through the *StarTrader* system. If the GM wishes to use the *Universe* hyperjump system for a *StarTrader* crew, assume that a **D** crew has a navigator with a Skill Level of **1** and a Mental Power of **5;** a **C** crew navigator has a Skill Level of **3** and Mental Power of **5;** a **B** Crew navigator has a Skill Level **4** and Mental Power **6;** and an **A** crew navigator has Skill Level **7** and Mental Power **6.**

[24.5] **If the players or their ships are involved in interception or combat, the *DeltaVee* combat system should be used to resolve the situation.**

When interception is declared in *StarTrader,* the GM sets up the *DeltaVee* maps as he sees fit. One possible configuration would be that in Scenario 3 of *DeltaVee.* The opposing ships would be placed on opposite sides of Map **A.** The player attempting to avoid interception and combat must exit Map **D** towards Map **E** to escape. Alternatively, a planet could be placed on map **D.** If a player gets into orbit around or lands on the planet, he has escaped the combat.

[24.6] **The GM should present the information and options of *StarTrader* in a role-playing format.**

Thus, a player running a trade empire would not actually sit down and play *StarTrader*; the GM would play the game himself and describe the status of the markets, and announce opportunites through NPC's.

StarTrader Creative Credits

Game Design: **Nick Karp**
Physical Systems and Graphics: **Redmond A. Simonsen**
Game Development: **John Butterfield, Nick Karp**
Rules Editing: **Bob Ryer**
Playtesting: **Kenny Slepyan, Tony Roasrio, Andrew Schilling, Phillip Marchal**
Blindtesting: **David Spangler, Julie Spangler, Lory Ferm, Jon Jones, Brian Peterson, Richard A. Edwards, Wes Divin, Eric Damron.**
Production: **Ted Koller, Manfred F. Milkuhn, Michael E. Moore, Ken Stec, Barbara Young**

Warehouses and Factories

Player A	Player B	Player C	Player D	Player E	Player F

SYSTEM ______

Prices
IN HECTOTRANS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Market Position	DEALER	CONTRACTOR	MANAGER

Market Position	DEALER	CONTRACTOR	MANAGER

Market Position	DEALER	CONTRACTOR	MANAGER

Market Position	DEALER	CONTRACTOR	MANAGER

Market Position	DEALER	CONTRACTOR	MANAGER

Market Position	DEALER	CONTRACTOR	MANAGER

STAR SYSTEM DISPLAY MASTER

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Players who wish to add Systems to the present *StarTrader* game, or who are using *StarTrader* in conjunction with a *Universe* campaign should make photocopies of this sheet *before* filling it out.

Players should fill in the name of the System represented on the Display, and indicate in the boxes provided beneath the System name area whether the System has a Safe Berth and/or Shipyard. In the System Space and On Planet boxes, write in the System's Security Rating and Patrol Value, respectively. Beneath those boxes are areas for Port Class, Law Level, and market information, which should also be written in. The area immediately to the right is provided to record Hyperjump Chances to *and* from the other Systems.

Players should use any available markers to record Market Positions, Warehouses, Factories, and Prices.

For details on the derivation of the various System values, see Section 24.0.

Hyperjump Chances

FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
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FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______
FROM ______ TO ______ CHANCE ______

System Space	On Planet
SECURITY RATING: ______	PATROL VALUE: ______

Port Class ______ **Law Level** ______

Abundant Commodities

______

______

Markets

______ S/D MODIFIER ______
______ S/D MODIFIER ______
______ S/D MODIFIER ______
______ S/D MODIFIER ______
______ S/D MODIFIER ______
______ S/D MODIFIER ______

[6.9] NEWS CHIT SUMMARY

OPPORTUNITY CHITS

1. **Slaves.** Buy (1) Mu Herculis; sell Epsilon Eridani.
2. **Weapons.** Buy (3) Epsilon Eridani; sell Mu Herculis.
3. **Weapons.** Buy (10) Tau Ceti; sell Gamma Leporis.
4. **Battle Comm Pod.** Available Gamma Leporis.
5. **Furs.** Buy (10) Mu Herculis Spaceport; sell (30) Beta Hydri Spaceport. 10 units available; requires no cargo space.
6. **Slaves.** Buy (2) Mu Herculis; sell Beta Hydri.
7. **Tempus.** Buy (15) Beta Hydri; sell Gamma Leporis.
8. **Emissary** and staff to be taken from Epsilon Eridani Spaceport to Mu Herculis Spaceport. Fills one Passenger pod. Carrier must have Reputation Level of 20 or higher. Receive 200 HT's upon arrival.
9. **Exotic Alien Plants** to be taken from Gamma Leporis Spaceport to Epsilon Eridani Spaceport. Fills one Cargo Pod (may not be stored in hull). Receive 150 HT's and add 3 to Reputation Level upon safe arrival.
10. **Slaves.** Buy (1) Mu Herculis; sell Gamma Leporis.
11. **Slaves.** Buy (4) Mu Herculis; sell Gamma Leporis.
12. **Tempus.** Buy (12) Epsilon Eridani; sell Gamma Leporis.
13. **Spear** and/or 5 illegal pods. Available Beta Hydri.
14. **Illegal pods** (one of *each* type). Available Tau Ceti.
15. **Exploration Expedition** announced by independent corporation. Player can send one legal ship along. Roll 1D and place ship that number of turns ahead on Game-Turn Record Track. However, if a 1 is rolled, the ship is destroyed. If and when the ship returns, roll 2D and multiply by 50 to determine HT reward.
16. **Dagger** and/or one illegal pod. Available Tau Ceti.
    ERRATUM: *Counter incorrectly reads "Slaves."*
17. **Weapons.** Buy (8) Epsilon Eridani; sell Gamma Leporis.
18. **Weapons.** Buy (3) Beta Hydri; sell Gamma Leporis.
19. **Tempus.** Buy (10) Tau Ceti; sell Sigma Draconis.
20. **Any Illegal Hull** and/or 5 pods. Available Epsilon Eridani.
21. **Sword** and/or 3 illegal pods. Available Mu Herculis.
22. **Unique Creatures** to be taken from Mu Herculis Spaceport to Epsilon Eridani Spaceport. Fills one Passenger Pod. Receive 150 HT's upon safe arrival.
23. **Weapons.** Buy (5) Epsilon Eridani; sell Mu Herculis.
24. **Dagger** and/or 1 illegal pod. Available Sigma Draconis.
25. **Weapons.** Buy (5) Beta Hydri; sell Mu Herculis.
26. **Illegal Pods** (one of *each* type). Available Epsilon Eridani.

EVENT CHITS

1. **Psychic Jam.** An unidentified radiation flows through the ether, disrupting all psionic emanations. Subtract 4 from all Hyperjump Chance dice rolls this Game-Turn.
2. **Alien Race,** newly discovered, has been contacted by the federation; panic spreads. Reduce all prices by 3. Remove chit from play.
3. **General War.** All monopole prices up 3. All alloy prices up 6. All iso-

[23.6] SUMMARY OF CORPORATIONS

2. ASSOCIATION OF INTERSTELLAR ANARCHISTS (AIA)

The AIA is a terrorist group bent on securing the independence of the Sigma Draconis System from the federation, much against the wishes of the System's peaceful citizenry.

Reputation: None. **Connections:** Pol (9); Bus (0); Crim (5). **Assets:** 200 HT. **Market Positions:** None. **Factories:** None. **Warehouses:** None. **Ships:** *Sword* (A crew) with 1 Arsenal, 1 Battle Comm, 1 Cargo, 1 Augmented Jump; in Sigma Draconis System Space. *Flute* (A crew) with 2 Cargo, 1 Light Weapons, 1 Augmented Jump; On Planet in Epsilon Eridani with 4 units of Weapons (use Opportunity chit #2). **Agents:** Two Gun aboard *Sword*. **Loans Outstanding:** None. **Victory Option A:** Destroy hulls of 5 enemy spaceships through combat or sabotage. **Victory Option B:** No enemy spaceships enter Sigma Draconis Spaceport for 6 consecutive Game-Turns (regardless of reason), and possess Market Manager position in 2 Sigma Draconis commodities. **Victory Option C:** None. **Special Rules:** The AIA has no Reputation marker; it may never be investigated, may never carry passengers, and may never receive a Reputation Bonus. The AIA may not attempt to undermine enemy market positions, take out loans, purchase factories. No player's Reputation Level decreases by intercepting or firing upon an AIA spaceship.

3. HOUSTON FEARLESS

Houston Fearless is an Earth-based trade corporation, specializing in the trade of super-isotopes, the potent elements that power the fission generators of the 23rd Century. Founded in the 22nd Century, Houston Fearless has many archaic vessels.

Reputation: 28. **Connections:** Pol (3); Bus (10); Crim (0). **Assets:** 500 HT. **Market Positions:** Market Manager (Isotopes) at Tau Ceti; Contractor (Isotopes) at Mu Herculis; Dealer (Isotopes) at Sigma Draconis and Epsilon Eridani. **Factories:** None. **Warehouses:** 4 at Tau Ceti; 1 each at Mu Herculis and Epsilon Eridani. **Ships:** *Corco Zeta* (B crew) with 3 Cargo, 1 Passenger; in Tau Ceti Spaceport. Two *Corco Zetas* (B crews) each with 4 Cargo; 8 Isotope units; both in Mu Herculis Spaceport. **Agents:** None. **Loans Outstanding:** None. **Victory Option A:** 2500 HT in assets. **Victory Option B:** 2000 HT in assets, and Market Manager or Contractor positions in Isotopes in all Systems. **Victory Option C:** 1500 HT in assets, Reputation Level at least 35, and Market Manager or Contractor position in any commodity other than Isotopes in all Systems where it is marketable. **Special Rules:** None.

4. BELISAR POLITICAL

A trading corporation founded by an ex-chairman of the federation to gain prestige in non-political circles, and either the funds or force to aid a return to power.

Reputation: 30. **Connections:** Pol (9); Bus (3); Crim (0). **Assets:** 800 HT. **Market Positions:** None. **Factories:** None. **Warehouses:** None. **Ships:** *Piccolo* (A crew) in Beta Hydri Spaceport. **Agents:** Dragon aboard *Piccolo*. **Loans Outstanding:** None. **Victory Option A:** 2000 HT in assets. **Victory Option B:** 1500 HT in assets, Reputation Level 40, Business Connection Level 10, and Reputation Level at no point falls below 25. **Victory Option C:** 1000 HT in assets, and own at least 2 military hulls with at least 6 undamaged military pods between them. **Special Rules:** None.

5. HOLYOKE ARBITRAGE

A corporation noted for its unscrupulous dealings and misuse of the opportunities of the federation's free-market economy.

Reputation: 17. **Connections:** Pol (1); Bus (3); Crim (3). **Assets:** 400 HT. **Market Positions:** Dealer (Alloys) at Sigma Draconis; Dealer (Spice) at Epsilon Eridani. **Factories:** None. **Warehouses:** 2 each at Sigma Draconis and Epsilon Eridani. **Ships:** *Leviathan* (B crew) with 14 Cargo, 2 Passenger, 1 Light Weapons, 1 Augmented Jump; in Sigma Draconis Spaceport. *Clarinet* (A crew) with 3 Light Weapons, 2 Cargo; in Epsilon Eridani Spaceport. **Agents:** None. **Loans Outstanding:** None. **Victory Option A:** 2500 HT in assets. **Victory Option B:** 1000 HT in assets and Market Manager position in all markets for any one commodity (write down commodity). **Victory Option C:** None. **Special Rules:** None.

6. GAMMA LEPORIS CORPORATION (GAMLEPCO)

The Gamma Leporis Corporation financed and guided the first expedition to and subsequent colonization of the Gamma Leporis System, and remains that System's most important operator.

Reputation: 20. **Connections:** Pol (3); Bus (2); Crim (0). **Assets:** 250 HT. **Market Positions:** Market Manager (Alloys) at Gamma Leporis; Dealer (Alloys) at Mu Herculis and Beta Hydri. **Factories:** 5 (Alloys) at Gamma Leporis. **Warehouses:** 4 at Gamma Leporis. **Ships:** *Flute* (A crew) with 2 Cargo, 1 Light Weapons; in Gamma Leporis Spaceport; *Phoenix* (B crew) with 5 Cargo, 1 Augmented Jump; in Gamma Leporis Spaceport. **Agents:** Dwarf in Gamma Leporis Spaceport. **Loans Outstanding:** None. **Victory Option A:** 2000 HT in assets. **Victory Option B:** 1500 HT in assets, and Market Manager (Alloys) position in at least 3 Systems (one of which must be Gamma Leporis) and Contractor position (Alloys) in 3 other Systems. **Victory Option C:** 1000 HT in assets, and price of Alloys 5 or less in all Systems. **Special Rules:** None.

7. QUASAR ENTERPRISES

A newly formed subsidiary of the federation's largest trading company, Galactic Trading, Inc. To a limited extent, it has the power of the parent company in support.

tope prices up 2. No new ships may be purchased this turn and next turn (including illegal ships; ignore Opportunity chits indicating such). Add 5 to any player dice rolls for sale of his ships this Game-Turn. Increase all Patrol Values by 4 this Game-Turn.

4. Inflation. Masterful counterfeit operations dump mass quantities of fake currency on the market; reduce all assets by 50% (round remaining funds up). Reduce all outstanding loans in the same way (do not adjust interest rates). Remove chit from play.

5. Civil War on Gamma Leporis. Triple value of weapons sold on Gamma Leporis this turn. Any ships currently at the Gamma Leporis Spaceport are seized by the revolutionary government; remove them from play and reimburse the owning players 50% of their list price (for the hull and all pods, but not the crew). Any warehouses and factories on Gamma Leporis are also lost at half price. Any goods in seized ships or warehouses are lost.

6. Colony. A planet in the Mu Herculis system is newly colonized; increase the prices of all commodities in that system by 5.

7. Monopole production technical breakthrough. Add 3 to all S/D modifiers for monopoles in all Transactions Phases from now on. Remove chit from play.

8. Spice production technical breakthrough; synthetic spice available. Add 2 to all S/D modifiers for spice in all Transactions Phases from now on. Remove chit from play.

9. Isotopes technical breakthrough; new uses for isotopes discovered. Subtract 3 from all S/D modifiers for isotopes in all Transactions Phases from now on, to a maximum of a −10 modifier. Remove chit from play.

10. Plague spreads throughout the federation. All spice prices up 4. No hyperjumps may be conducted to or from a Spaceport this turn (ships may jump to and from On Planet or System Space boxes). Because of quarantines, increase all Patrol Values and Security Ratings by one this turn. Remove chit from play.

11. Inquiry. Federation reform government audits everybody; reduce each player's reputation by 2D (roll separately).

12. Pirates raid Mu Herculis. All goods in warehouses there are lost. Roll 1D for each ship in the Mu Herculis Spaceport; on a result of 3 or less, the ship and all aboard are lost; on a result of 4 or higher, the ship is placed in the System Space box. Federation on guard everywhere; increase all Patrol Values and Security Ratings by 2 for this Game-Turn.

13. Special Tax is imposed on business. Each player must immediately pay 1HT for each warehouse unit, 2HT's for each factory unit, and 5HT's for each spaceship. If a player has insufficient assets to pay, the excess debt is ignored.

14. Alloys discovered in large quantities on remote world of federation. All alloy prices down 5. All monopole and isotope prices up 2. Remove chit from play.

NOTES:

When slaves, weapons, or tempus are available for purchase, the player taking advantage of the opportunity may buy from 1 to 10 units at the listed price. The per unit sale price is determined in a subsequent Opportunity Phase, after arrival at the destination On Planet box, in accordance with the Black Market Table.

When illegal spaceships and/or pods are available, they are purchased in the On Planet box for prices listed on the Ship Characteristics Summary.

Reputation: 30. **Connections**: Pol (5); Bus (10); Crim (3). **Assets**: 1000 HT. **Market Positions**: None. **Factories**: None. **Warehouses**: None. **Ships**: *Monarch* (A crew) with 8 Cargo, 4 Light Weapons, 1 Augmented Jump; in Beta Hydri Spaceport. *Piccolo* (A crew) in Beta Hydri Spaceport. **Agents**: None. **Loans Outstanding**: None. **Victory Option A**: 2500 HT in assets. **Victory Option B**: 2000 HT in assets and 10 warehouses (total, in all Systems) and at least 4 factory units in each commodity (total, in all Systems). **Victory Option C**: 2000 HT in assets and Market Manager position in all four commodities in at least one System. **Special Rules**: Quasar Enterprises may borrow up to 1000 HT, regardless of status (ignore normal procedure for maximum loan calculation); Quasar may never borrow more than 1000 HT, however. Add 200 HT to the amount needed for each type of victory for each Level Quasar's Reputation falls below 20, even if the Level rises to or above 20 again.

8. MONOGRAM INDUSTRIES

Based on Mu Herculis, Monogram is one of the largest producers of Monopoles in the federation.

Reputation: 25. **Connections**: Pol (4); Bus (6); Crim (0). **Assets**: 600 HT. **Market Positions**: Market Manager (Monopoles) at Mu Herculis. **Factories**: 10 (Monopoles) at Mu Herculis. **Warehouses**: 4 at Mu Herculis (10 units of Monopoles are already stored there). **Ships**: None. **Agents**: None. **Loans Outstanding**: 300 HT, due on turn 4; interest rate is 28 per turn. **Victory Option A**: 2000 HT in assets. **Victory Option B**: 1500 HT in assets, Reputation Level at least 30, and factories producing at least 25 units of Monopoles per turn. **Victory Option C**: 1200 HT in assets and factories producing at least 10 units in all four commodities. **Special Rules**: None.

9. GATES-LEARJET

Originally a manufacturer of small, intrasystem spacecraft, Gates-Learjet Corporation expanded into interstellar trade when a debtor company went bankrupt and gave Gates its vessels in partial compensation.

Reputation: 22. **Connections**: Pol (2); Bus (5); Crim (4). **Assets**: 300 HT. **Market Positions**: Contractor (Alloys, Isotopes) at Mu Herculis; Dealer (Alloys) at Epsilon Eridani. **Factories**: None. **Warehouses**: 2 at Mu Herculis; 2 at Sigma Draconis; 1 at Epsilon Eridani. **Ships**: *Monarch* (C crew) with 8 Cargo (containing 16 units of Isotopes), 4 Passenger; in Mu Herculis Spaceport. *Phoenix* (B crew) with 4 Cargo, 2 Light Weapons; in Epsilon Eridani Spaceport. **Agents**: None. **Loans Outstanding**: None. **Victory Option A**: 2000 HT in assets. **Victory Option B**: 1500 HT in assets, at least one undamaged military hull, and Criminal Connection Level at 10. **Victory Option C**: 1500 HT in assets, all Connection Levels at least 8, and Reputation Level at least 30. **Special Rules**: Add 1 to all Smuggling Check dice rolls made by Gates.

10. EON FLASHCORP

One of the shadier members of the business community, Eon is frequently indicted for smuggling and other illicit activities, always managing to avoid being disbanded through political contacts, technicalities, and various sly dealings.

Reputation: 10. **Connections**: Pol (7); Bus (1); Crim (7). **Assets**: 200 HT. **Market Positions**: None. **Factories**: None. **Warehouses**: 1 each at Mu Herculis and Gamma Leporis. **Ships**: *Corco Gamma* (A crew) with 2 Cargo, 1 Augmented Jump; in Mu Herculis Spaceport. *Dagger* (A crew) with 1 Battle Comm, 1 Augmented Jump; On Planet at Epsilon Eridani with 5 units of Tempus (use opportunity chit #12). **Agents**: None. **Loans Outstanding**: None. **Victory Option A**: 2000 HT in assets. **Victory Option B**: 1200 HT in assets, Criminal and Political Connection Levels both at least 9, and own at least 4 streamlined hulls. **Victory Option C**; None. **Special Rules**: Eon Flashcorp may take out no loans (except from other players).

11. McRADIE'S CREW

During standard military maneuvers, a heavily armed federation Spear class vessel disappeared. For several weeks it was thought to have hit an asteroid and disintegrated, but soon it was detected near jump position of the Gamma Leporis System. There, the ship intercepted and destroyed a group of four unarmed merchant vessels approaching the System. From then on, no craft was safe from the fire of First Officer McRadie's mutinied crew.

Reputation: 0. **Connections**: Pol (0); Bus (5); Crim (6). **Assets**: 900 HT. **Market Positions**: None. **Factories**: None. **Warehouses**: None. **Ships**: *Spear* (B crew) with 1 Arsenal, 1 Heavy Weapons, 1 Battle Comm, 2 Cargo; in Beta Hydri System Space. **Agents**: None. **Loans Outstanding**: None. **Victory Option A**: 1800 HT in assets. **Victory Option B**: 1200 HT in assets, Political Connection Level 10, and Reputaion Level at least 35. **Victory Option C**: None. **Special Rules**: McRadie's crew never undergoes an inquiry, and may never purchase warehouses, factories, or legal spaceships (except from other players), and may never take out loans.

12. ARCHANGEL LINES

A transport line serving passengers moving between major Systems at the fringe of the federation.

Reputation: 27. **Connections**: Pol (2); Bus (2); Crim (0). **Assets**: 250 HT. **Market Positions**: None. **Factories**: None. **Warehouses**: None. **Ships**: *Flute* (A crew) with 2 Passenger, 1 Augmented Jump; in Sigma Draconis Spaceport. *Clarinet* (A crew) with 4 Passenger, 1 Augmented Jump, 1 Light Weapons; in Beta Hydri Spaceport. **Agents**: None. **Loans Outstanding**: None. **Victory Option A**: 1000 HT in assets. **Victory Option B**: 800 HT in assets, Reputation Level at least 35, at least 3 ships. **Victory Option C**: None. **Special Rules**: Archangel can never purchase factories, and no ship owned by Archangel may carry more than one Cargo pod.

Player Log

Name ______________________________

CONNECTIONS

POLITICAL ________ BUSINESS ________ CRIMINAL ________

LOANS

AMOUNT	INTEREST	DUE

PASSENGERS

TURN	#GROUPS	DESTINATION

MARKET BIDS

TURN	INIT BID	COMMODITY	LOCATION	BUY/SELL	PRICE

NOTES

SPECIAL COMMODITIES

COMMODITY	DESTINATION	AMOUNT

SPACESHIP NR ________ DAMAGE ________

HULL/NAME ________

CARGO CAP ________ PASS CAP ________

PROTEC ________ COMBAT ________ ( )

INTERCEPT ________ CREW ____ / ____

PODS ________

SPACESHIP NR ________ DAMAGE ________

HULL/NAME ________

CARGO CAP ________ PASS CAP ________

PROTEC ________ COMBAT ________ ( )

INTERCEPT ________ CREW ____ / ____

PODS ________

SPACESHIP NR ________ DAMAGE ________

HULL/NAME ________

CARGO CAP ________ PASS CAP ________

PROTEC ________ COMBAT ________ ( )

INTERCEPT ________ CREW ____ / ____

PODS ________

SPACESHIP NR ________ DAMAGE ________

HULL/NAME ________

CARGO CAP ________ PASS CAP ________

PROTEC ________ COMBAT ________ ( )

INTERCEPT ________ CREW ____ / ____

PODS ________

SPACESHIP NR ________ DAMAGE ________

HULL/NAME ________

CARGO CAP ________ PASS CAP ________

PROTEC ________ COMBAT ________ ( )

INTERCEPT ________ CREW ____ / ____

PODS ________

SPACESHIP NR ________ DAMAGE ________

HULL/NAME ________

CARGO CAP ________ PASS CAP ________

PROTEC ________ COMBAT ________ ( )

INTERCEPT ________ CREW ____ / ____

PODS ________

StarTrader Counter Section Nr. 1 (200 pieces): Front

Quantity of Sections of this identical type in game: 1. Total quantity of Sections (all types) in game: 1.

Slaves OP 11	Weapons OP 3	BtlComm OP 4	Any Pod OP 26	Enmisny OP 8	Tax EV 13	Gen War EV 3	Colony EV 6	Expdtn OP 15	Civil War EV 5
Weapons OP 23	Slaves OP 1	Dagger OP 24	Inflation EV 4	Slaves OP 10	Alien EV 2	Any Pod OP 14	Inquiry EV 11	Plague EV 10	Weapons OP 25

NEWS CHITS

Sword OP 21	Tempus OP 12	Tempus OP 7	Slaves OP 6	Creature OP 22	Psi Jam EV 1	AlloyDisc EV 14	Slaves OP 16	Weapons OP 18	Furs OP 5
Pirates EV 12	Spear OP 13	Weapons OP 2	Tempus OP 19	Plants OP 9	Any Ship OP 20	SpiceTec EV 8	Weapons OP 17	IsoTec EV 9	MonoTec EV 7

AGENTS

Two Gun	Crip	X	Tender	Willy
J. B.	Dwarf	Badger	Amy	Dragon

WAREHOUSES

Warehse 1	Warehse 1	Warehse 1	Warehse 1	Warehse 1
Warehse 1	Warehse 4	Warehse 4	Warehse 4	Warehse 4

Monpls PRICE SD–8	Monpls PRICE SD–4	Monpls 1	Monpls 1	Monpls 1	Monpls 1	Monpls 1	Monpls 1	Monpls 1	Monpls 1
Monpls PRICE SD–10	Monpls PRICE SD–9	Monpls 1	Monpls 4	Monpls 4	Monpls 4	Monpls 4	Monpls 4	Monpls 4	Monpls 4

COMMODITIES

Spice PRICE SD–9	Spice PRICE SD–8	Spice 1	Spice 1	Spice 1	Spice 1	Spice 1	Spice 1	Spice 1	Spice 1
S/D	Spice PRICE SD–3	Spice 1	Spice 4	Spice 4	Spice 4	Spice 4	Spice 4	Spice 4	Spice 4

A HT ×1	A HT ×10	A Mkt Position	A Mkt Position	B HT ×1	B HT ×10	B Mkt Position	C HT ×1	C HT ×10	C Mkt Position
A HT ×100	A REP	A Mkt Position	B HT ×100	B REP	B Mkt Position	B Mkt Position	C HT ×100	C REP	C Mkt Position

F HT ×1	F Mkt Position	E Mkt Position	E Mkt Position	E HT ×1	E HT ×10	D Mkt Position	D HT ×1	D HT ×10	C Mkt Position
F HT ×10	F Mkt Position	F Mkt Position	E Mkt Position	E HT ×100	E REP	D Mkt Position	D Mkt Position	D HT ×100	D REP

F HT ×100	Nebula 01	Coral 02	Knight 03	Needle 04	Sphinx 05	Quasar 06	Burst 07	Alloys PRICE SD–7	Alloys PRICE SD–10
F REP	Pluto 08	Alpha 09	Tsar 10	Hawk 11	Pulsar 12	Satyr 13	Regent 14	Alloys PRICE SD–8	Alloys PRICE SD–5

Game Turn	Alloys 1	Alloys 1	Alloys 1	Alloys 1	Alloys 1	Alloys 1	Alloys 1	Alloys 1	Alloys PRICE SD–9
Isotps PRICE SD–8	Alloys 1	Alloys 4	Alloys 4	Alloys 4	Alloys 4	Alloys 4	Alloys 4	Alloys 4	Alloys PRICE SD+1

Isotps PRICE SD–7	Isotps PRICE SD–1	Isotps 1	Isotps 1	Isotps 1	Isotps 1	Isotps 1	Isotps 1	Isotps 1	Isotps 1
Isotps PRICE SD–9	Isotps PRICE SD+1	Isotps 1	Isotps 4	Isotps 4	Isotps 4	Isotps 4	Isotps 4	Isotps 4	Isotps 4

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StarTrader Counter Section Nr. 1 (200 pieces): Back

Pol 2	Pol 2	Pol 3	Pol 3	Pol 3	Pol 5	Pol 5	Crim 1	Crim 1	Crim 3
2	2	4	4	4	1	1	1	1	3
Pol 7	Pol 7	Pol 8	Pol 8	Pol 10	Pol 10	Crim 3	Crim 4	Crim 4	Crim 5
1	1	4	4	1	1	3	3	3	2
Bus 2	Bus 2	Bus 3	Bus 3	Bus 5	Bus 5	Crim 5	Crim 6	Crim 6	Crim 8
2	2	4	4	1	1	2	1	1	2
Bus 6	Bus 6	Bus 8	Bus 8	Bus 10	Bus 10	Crim 8	Crim 8	Crim 10	Crim 10
2	2	3	3	2	2	2	2	1	1

Warehse 2	Warehse 2	Warehse 2	Warehse 2	Warehse 2
Warehse 8	Warehse 8	Warehse 8	Warehse 8	Warehse 2

Agent	Agent	Agent	Agent	Agent
Agent	Agent	Agent	Agent	Agent

Monpls 2⊖	Monpls 2⊖	Monpls 2⊖	Monpls 2⊖	Monpls 2⊖	Monpls 2⊖	Monpls 2⊖	Monpls 2⊖	Monpls PRICE SD–6	Monpls PRICE SD–7
Monpls 8⊖	Monpls 8⊖	Monpls 8⊖	Monpls 8⊖	Monpls 8⊖	Monpls 8⊖	Monpls 8⊖	Monpls 2⊖	Monpls PRICE SD–8	Monpls PRICE SD–8

Spice 2	Spice 2	Spice 2	Spice 2	Spice 2	Spice 2	Spice 2	Spice 2	Spice PRICE SD–7	Spice PRICE SD–8
Spice 8	Spice 8	Spice 8	Spice 8	Spice 8	Spice 8	Spice 8	Spice 2	Spice PRICE SD–5	

D Mkt Position

D Mkt Position

D Mkt Position

D HT ×100 +1000

C Mkt Position

C HT ×100 +1000

C Mkt Position

C Mkt Position

E Mkt Position

E Mkt Position

E HT ×100 +1000

B Mkt Position

B Mkt Position

B HT ×100 +1000

B Mkt Position

F Mkt Position

F Mkt Position

F Mkt Position

A Mkt Position

A Mkt Position

A Mkt Position

A HT ×100 +1000

F HT ×100 +1000

Alloys PRICE SD–8	Alloys PRICE SD–7	Jump Failed	Jump Failed	Jump Failed	Jump Failed	Jump Failed	Jump Failed	Jump Failed	
Alloys PRICE SD–6	Alloys PRICE SD–7	Jump Failed	Jump Failed	Jump Failed	Jump Failed	Jump Failed	Jump Failed	Jump Failed	

Alloys PRICE SD–8	Alloys 2	Alloys 2	Alloys 2	Alloys 2	Alloys 2	Alloys 2	Alloys 2	Alloys 2	Alloys 2
Alloys PRICE SD–2	Alloys 8	Alloys 8	Alloys 8	Alloys 8	Alloys 8	Alloys 8	Alloys 8	Alloys 8	Alloys 2

Isotps 2	Isotps 2	Isotps 2	Isotps 2	Isotps 2	Isotps 2	Isotps 2	Isotps 2	Isotps PRICE SD–4	Isotps PRICE SD–7
Isotps 8	Isotps 8	Isotps 8	Isotps 8	Isotps 8	Isotps 8	Isotps 8	Isotps 2	Isotps PRICE SD–2	Isotps PRICE SD–8

Isotps PRICE SD–7

S/D Price Index	−18	−17	−16	−15	−14	−13	−12	−11	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12	+13	+14	+15	+16	+17	+18
Price Modifier	+7	+6	+6	+6	+5	+5	+5	+4	+4	+4	+3	+3	+3	+2	+2	+1	+1	0	0	0	−1	−1	−1	−2	−2	−2	−3	−3	−3	−4	−4	−4	−5	−5	−5	−5	−6

◄MOVE MARKER TO LEFT WHEN BUYING **Supply/Demand Track** MOVE MARKER TO RIGHT WHEN SELLING►

ABBREVIATED SEQUENCE OF PLAY

Including frequently used formulae and procedures.

1. BID PHASE
Record HT expenditures for Initiative and proposed transactions.

2. INITIATIVE PHASE
Determine Initiative Order and Turn Order.
Initiative Total (4.0): 2D + HT expenditure

3. NEWS PHASE
A. *Reveal and return to pools News chits in current turn space.*
B. *Draw fresh News chits.*
News Chits Draw (6.0): 1D ÷ 2 (round down)
C. *Examine appropriate chits.*
Eligibility for Chit Examination (6.0): 5HT and appropriate Connection Level

4. HYPERJUMP PHASE
Travel to destination Systems; resolve interception attempts.
Hyperjump Resolution (9.0): Successful if 2D is less than or equal to modified Jump Chance
Enter Safe Berth (9.3): Costs 5HT per ship per turn
Smuggling Check (16.0): Successful if modified 2D is greater than System Security Rating

5. TRANSACTIONS PHASE (For each commodity)
A. *Resolve non-player market activity.*
Market Activity (12.0): 2D + commodity's S/D Modifier
B. *Reveal bids.*
C. *Buy and sell commodities.*
Gain Market Position (13.0): Successful if 2D is less than or equal to number of units bought or sold (minimum of 6 units)
D. *Modify commodity's market price according to S/D marker's final position on track.*

6. OPPORTUNITY PHASE
Conducted in Turn Order.
- *Receive commodities produced in factories.*
- *Attempt sabotage.*
Sabotage Attempt (20.0): Costs 20HT × System Law Level; 2D + Criminal Connection Level
- *Attempt to undermine market position.*
Undermine Attempt (13.7): Costs 20HT; successful if 1D is less than difference between appropriate Connection Levels
- *Hire agents.*
Hire Agent Attempt (17.0): Successful if 2D × 5 is less than or equal to HT's expended
- *Embark passengers in eligible spaceships.*
Available Passengers (15.0): Number of groups equals sum of origin and destination Systems' Spaceport Classes; receive 5HT per group embarked
- *Use Opportunity chit previously examined.*
- *Sell illegal commodities.*

7. INVESTMENT PHASE
Conducted simultaneously in any order.
- *Purchase increase in Reputation Level.*
Increase Reputation (21.0): Costs 20HT; Levels of increase equal to 1D (no increase on roll of 6)
- *Purchase warehouse units.*
Purchase Warehouse (14.1): 20HT per unit
- *Purchase factory units.*
Purchase Factory (19.0): (|5 × commodity price| + 10HT| per factory unit
Sell Factory (19.4): (5× commodity price) per factory unit
- *Purchase, repair, or sell spaceships, hulls, pods.*
Purchase Ship (8.0): Hull list price + pods list price + (required Crew Groups × Crew Class bounty)
Sell Ship (8.4): 10 × (3D – Spaceport Class) equals percentage of list price received
Repair (7.8): See Summary of Ship Hull and Pod Characteristics
- *Hire or replace spaceship crews.*
- *Take out loans.*
Loan Availability (18.1): 100HT per ship + 20HT per factory and warehouse unit + assets
4-Turn Interest Payment (18.0): (Principal – Reputation) ÷ 20 (minimum of 1HT)
8-Turn Interest Payment (18.0): (Principal – Reputation) ÷ 10 (minimum of 1HT)
- *Pay off interest on existing loan.*
- *Increase Connection Levels.*
Gain Connection Level (5.0): Costs 10HT × new Level

8. INQUIRY PHASE
A. *Conduct federal Patrol Sweeps.*
Sweep (10.3): Successful evasion if modified 2D is greater than System Patrol Value
B. *Consult Inquiry Table as required.*
C. *Raise Reputation Levels (not above 20) for players whose current Levels are 1–19.*
D. *Award Reputation Bonuses for Reputation Levels 25 or higher.*
E. *Re-invert any Jump Failed counters to spaceship side.*

COMBAT SEQUENCE
Interrupts Hyperjump Phase as required.
A. **Interception Segment**
Interception (10.0): Successful if intercepting ship's modified Interception Rating + 1D is greater than or equal to evading ship's modified Interception Rating + 1D
B. **Attack Segment**
Fire Procedure (10.0): 1D + firing ship's Combat Strength (consult Combat Results Table)
Missile Fire (10.0): Target destroyed if 1D is equal to or less than the number of hits inflicted on target this Round
C. **Salvage Segment**
Salvage Attempt (11.4): 10 × (2D – 2) equals percentage of commodities that are salvageable

MISCELLANEOUS INFORMATION

- Each unit of alloys, isotopes, or weapons equals 1 cargo unit.
- Each unit of monopolies, spice, or tempus equals 0 cargo units, but some facility must be available to store them.
- Each warehouse unit holds 10 cargo units.
- Each cargo pod holds 2 cargo units. Each passenger pod holds 2 passenger or slave groups.
- Illegal spaceships and commodities may not enter a spaceport with a Law Level of 3 or 4.
- Illegal commodities may be sold only On Planet.
- Illegal spaceships may be repaired only in Tau Ceti spaceport.

[16.6] AGENT SUMMARY

Amy. Add 4 to the Hyperjump Chance when Amy is aboard a ship that is attempting to hyperjump.

Badger. Subtract 3 from the Security Rating of a system when Badger is aboard a ship attempting to land on planet.

Crip. The player controlling Crip may, during the Transactions Phase, consider himself a market manager of any one market commodity in the system, if Crip is in the system spaceport. **Exception:** Crip may not be used if another player is already the market manager of the commodity in question.

Dragon. Add 4 to the controlling player's initiative dice roll each Game-Turn.

Dwarf. Add 4 to the dice roll for any type of sabotage attempted by the controlling player if Dwarf is in the spaceport of the system where the sabotage attempt takes place.

J.B. Subtract 1 from every negative modification to the player's Reputation Level when J.B. is in any spaceport.

Tender. No sabotage may be attempted against the controlling player's spaceships, warehouses, and factories in a system, if Tender is present in the spaceport of that system.

Two Gun. Add 1 to the intercept die roll of a spaceship if Two Gun is aboard, whether the ship is attempting to intercept or avoid interception.

Willy. Add 2 to all rolls on the Black Market Table if Willy is on planet in the system where the controlling player is selling.

X. Add 5 to the Combat Strength of the spaceship X is aboard.

Gamma Leporis

Port Class 1 · Law Level 3 · SAFE BERTH · SYSTEM SPACE · PATROL VALUE 4 · ON PLANET · Abundant Goods: Alloys · SECURITY RATING 6

Prices in HectoTrans: 1 | 2 [+1] Alloys | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20

Warehouses and Factories: Player A | Player B | Player C | Player D | Player E | Player F

Market Position (Alloys): DEALER | CONTRACTOR | MANAGER

Beta Hydri

Port Class 4 · Law Level 4 · SAFE BERTH · SHIP YARD · SYSTEM SPACE · PATROL VALUE 8 · ON PLANET · Abundant Goods: None · SECURITY RATING 10

Prices in HectoTrans: 1 | 2 | 3 | 4 | 5 | 6 [−8] Alloys | 7 | 8 | 9 | 10 [−8] Isotps | 11 | 12 | 13 | 14 | 15 [−9] Spice | 16 | 17 | 18 [−10] Monpls | 19 | 20

Warehouses and Factories: Player A | Player B | Player C | Player D | Player E | Player F

Market Position (Alloys): DEALER | CONTRACTOR | MANAGER

Market Position (Monpls): DEALER | CONTRACTOR | MANAGER

Market Position (Isotps): DEALER | CONTRACTOR | MANAGER

Market Position (Spice): DEALER | CONTRACTOR | MANAGER

Epsilon Eridani

Port Class 3 · Law Level 4 · SAFE BERTH · SHIP YARD · SYSTEM SPACE · PATROL VALUE 7 · ON PLANET · Abundant Goods: None · SECURITY RATING 9

Prices in HectoTrans: 1 | 2 | 3 | 4 | 5 [−7] Alloys | 6 | 7 | 8 | 9 | 10 [−7] Isotps | 11 | 12 | 13 | 14 [−8] Spice | 15 | 16 | 17 [−9] Monpls | 18 | 19 | 20

Warehouses and Factories: Player A | Player B | Player C | Player D | Player E | Player F

Market Position (Monpls): DEALER | CONTRACTOR | MANAGER

Market Position (Alloys): DEALER | CONTRACTOR | MANAGER

Market Position (Spice): DEALER | CONTRACTOR | MANAGER

Market Position (Isotps): DEALER | CONTRACTOR | MANAGER

STAR TRADER

SUMMARY OF HYPERJUMP CHANCE MODIFIERS

Add 1...*if ship has a Class C crew*
Add 2...*if ship has an Augmented Jump Pod*
Add 3...*if ship has a Class B crew*
Add 5...*if ship has a Class A crew*
With modified chance of 12 or more, jump is automatically successful

Sigma Draconis

Port Class 1 · Law Level 1 · SYSTEM SPACE · PATROL VALUE 2 · ON PLANET · Abundant Goods: Spice, Isotopes · SECURITY RATING 4

Prices in HectoTrans: 1 | 2 | 3 | 4 [−1] Isotps | 5 | 6 | 7 | 8 [−5] Alloys | 9 | 10 [−3] Spice | 11 | 12 | 13 | 14 [−8] Monpls | 15 | 16 | 17 | 18 | 19 | 20

Warehouses and Factories: Player A | Player B | Player C | Player D | Player E | Player F

Market Position (Alloys): DEALER | CONTRACTOR | MANAGER

Market Position (Monpls): DEALER | CONTRACTOR | MANAGER

Market Position (Isotps): DEALER | CONTRACTOR | MANAGER

Market Position (Spice): DEALER | CONTRACTOR | MANAGER

Tau Ceti

Port Class 3 · Law Level 2 · SAFE BERTH · SHIP YARD · SYSTEM SPACE · PATROL VALUE 5 · ON PLANET · Abundant Goods: Isotopes, Spice · SECURITY RATING 7

Prices in HectoTrans: 1 | 2 | 3 | 4 [−9] Isotps | 5 | 6 [−10] Alloys | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20

Warehouses and Factories: Player A | Player B | Player C | Player D | Player E | Player F

Market Position (Alloys): DEALER | CONTRACTOR | MANAGER

Market Position (Isotps): DEALER | CONTRACTOR | MANAGER

Mu Herculis

Port Class 0 · Law Level 1 · SYSTEM SPACE · PATROL VALUE 0 · ON PLANET · Abundant Goods: Monopolies · SECURITY RATING 3

Prices in HectoTrans: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 [−9] Alloys | 9 | 10 | 11 [+1] Isotps | 12 [−4] Monpls | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20

Warehouses and Factories: Player A | Player B | Player C | Player D | Player E | Player F

Market Position (Alloys): DEALER | CONTRACTOR | MANAGER

Market Position (Isotps): DEALER | CONTRACTOR | MANAGER

Market Position (Monpls): DEALER | CONTRACTOR | MANAGER

[21.8] INQUIRY TABLE

1 or less Player acquitted; increase Reputation to 8.

2 The player must pay a minor fine of 100HT. If he does not have the cash available, he must immediately sell inventory to make up difference, as in 18.4. Each of his Connection Levels is reduced by 2. Increase his Reputation Level to 6.

3 The player must pay a major fine of 400HT. If cash is not available, he must sell inventory to make up the difference, as in 18.4. Each of his Connection Levels is reduced by 4. Increase the player's Reputation Level to 6. Each of the supporting player's (if any) Connection Levels is reduced by 2, and his Reputation Level is reduced by 1D.

4 The player's corporation is taken over by its criminal connections. He is out of the game. All his market positions, spaceships, agents, commodities, assets, warehouses, and factories are removed from the display. The supporting player's Political Connection Level is reduced by 4, his other Connection Levels by 2 each, and his Reputation Level by 2D.

5 or more The player's corporation is disbanded by the federation. He is out of the game. Remove all facilities, as in result 4. The supporting player's Political Connection Level is reduced to 0, other Connection Levels are reduced by 3 each, Reputation Level by 2D.

[21.7] REPUTATION LEVEL SUMMARY

A player's Reputation Level will be raised or lowered as the player meets the following conditions...

+3	...has a current Reputation Level between 1 and 19 at the conclusion of an Inquiry Phase (Level may not be raised above 20 in this manner).
+2	...rises in Market Position.
	...gains one Business Connection Level.
+1	...gains one Political Connection Level.
+1D	...expends 20HT (no increase, however, on a roll of 6).
−1	...gains one Criminal Connection Level.
−2	...falls in Market Position.
−4	...misses interest payment on loan.
−10	...violates written agreement.
−1D	...violates oral agreement.
−2D	...attempts to intercept, unless ship has Battle Comm Pod.
	...fires on ship that has not attempted interception.
	...forced to jettison while attempting to smuggle.
−3D	...has his ship confiscated while attempting to smuggle.

A player's Reputation Level may also be altered as a result of sabotage, an attempt to undermine a market position, if caught in a federal sweep, or as a result of an inquiry.

[20.5] SABOTAGE TABLE

2D	EFFECT ON TARGET	EFFECT ON REPUTATION
2-6	0	0
7-10	0	12
11-12	1	10
13-14	2	6
15-16	3	4
17-18	5	0
19-20	7	0
21 or more	10	OP-8

MODIFIERS: (Applied to Both Dice Rolls)
Add sabotaging player's Criminal Connection Level to dice roll.
Subtract number of production units in factory (if the target of the attempt is a factory).

EFFECT ON TARGET:
Results indicate number of hits to **ship**; or number of commodity units lost from **warehouse** (saboteur's choice of which commodities); or number of Game-Turns **factory** will fail to produce.

EFFECT ON REPUTATION
Results indicate the number of Reputation Points lost by the saboteur. OP-8 indicates that the saboteur may choose any other player to lose 8 Reputation Points.

[16.6] BLACK MARKET TABLE

1D	ILLEGAL GOOD: SLAVES	WEAPONS	TEMPUS
1	5	8	12
2	8	10	15
3	10	15	25
4	15	25	35
5	20	30	50
6	25	40	70

Results indicate the number of HT's for which each unit of the indicated good may be sold.

[23.4] CORPORATION TABLE Optional

1D	NUMBER OF PLAYERS: 2	3	4	5	6
1	3,9	2,3,10	2,5,8,9	2,3,5,6,8	3,6,7,8,10,11
2	6,9	4,5,6	3,4,7,12	6,7,8,10,11	3,4,6,7,9,10
3	6,7	4,7,8	6,7,9,11	5,7,8,10,12	5,6,7,9,11,12
4	7,8	6,7,9	4,6,8,10	2,4,8,9,12	3,5,7,8,9,10
5	4,8	8,9,10	3,8,9,11	4,5,6,7,9	2,4,7,8,11,12
6	4,12	5,11,12	5,6,7,10	3,4,7,9,11	2,4,5,6,8,9

Roll 1D and cross-reference the result with the number of players in the game to determine which corporations (identified by number; see 23.6) are used. Each player then rolls 1D. The player with the highest roll chooses which of the available corporations he will play; then the player with the second highest roll chooses; and so on.

[10.7] COMBAT RESULTS TABLE

ATTACKER'S COMBAT RATING ÷ 10	TARGET'S PROTECTION RATING: 1	2	3	4
2-4	0	0	0	0
5-6	1	0	0	0
7-9	1	1	0	0
10-12	2	1	1	0
13-16	2	2	1	1
17-20	3	2	2	1
21-25	4	3	2	2
26-30	5	4	3	2
31 or more	6	5	4	3

Results indicate the number of hits taken by the target ship. **Note:** if missiles are used in an attack, the attacking player rolls 1D. If the die roll is equal to or less than the number of hits taken by the target ship *in the current round*, the target ship is completely destroyed.

[8.9] CREW CHART

CREW CLASS	BOUNTY	SALARY
A	20	4
B	10	2
C	6	1
D	2	0

Costs are expressed in HT's. Salaries are optional.

[7.7] SUMMARY OF SHIP AND HULL CHARACTERISTICS

CLASS	POD CAP	INT	CREW	COMBAT	PROT	CARGO CAP	PUR COST	REPAIR COST
Clarinet	5	2	1	3	2	N	160	20
Corco Gamma[S]	2	1	1	2	1	N	80	10
Corco Iota	6	2	1	3	3	1	190	30
Corco Mu	9	1	1	2	1	1	160	30
Corco Zeta	4	1	1	1	1	N	80	10
Dagger[SM]	1	2	1	5	4	N	250	60
Flute[S]	3	3	1	3	3	N	225	30
Leviathan	18	1	4	1	1	6	200	20
Monarch	12	1	3	1	1	4	150	15
Phoenix	6	1	1	1	1	2	85	10
Piccolo[S]	0	3	1	2	2	N	70	10
Spear[M]	5	1	2	5	4	1	600	100
Sword[M]	3	3	1	5	4	N	500	80

S: Streamlined hull (capable of landing on planet).
M: Military hull or pod (illegal and available only through opportunity chit).

POD TYPE	COMBAT	CREW	PUR COST
Arsenal[M]	7(14)	1	100
Augmented Jump Does not count against hull pod total.	0	0	10
Battle Comm[M]	6	2	50
Cargo May carry two cargo units.	0	0	4
Heavy Weapons[M]	5(10)	1	80
Hunter[M]	4(7)	0	30
Light Weapons	3(5)	0	17
Passenger May carry two passenger or slave groups.	0	1	15

Ship Hulls section lists **Pod Cap** (maximum number of pods ship hull can carry); **Int** (Interception Rating); **Crew** (number of crew groups required to man hull); **Combat** (Combat Rating); **Prot** (Protection Rating); **Cargo Cap** (cargo units that can be carried in hull; note that **N** indicates hull can carry only spice, monopoles, and/or tempus); **Pur Cost** (purchase cost in HT's); **Repair Cost** (in HT's). **Pods** section lists **Combat** (Combat Rating, without using missiles and — in parentheses — using missiles); **Crew** (number of crew groups required to man pod); **Pur Cost** (purchase cost in HT's; all pods have a 10 HT repair cost).

Reputation Track

0 INQ	1 INQ REP +3	2 INQ REP +3	3 INQ REP +3	4 INQ REP +3	5 INQ REP +3	6 REP +3	7 REP +3	8 REP +3	9 REP +3	10 REP +3	11 REP +3	12 REP +3	13 REP +3	14 REP +3	15 REP +3	16 REP +3	17 REP +3	18 See 21.3	19 See 21.3	20	21	22	23	24	25 5 HT's	26 5 HT's	27 10 HT's	28 10 HT's	29 15 HT's	30 20 HT's	31 20 HT's	32 20 HT's	33 20 HT's	34 25 HT's	35 25 HT's	36 30 HT's	37 30 HT's	38 30 HT's	39 35 HT's	40 40 HT's

Game-Turn Record Track

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

350P21