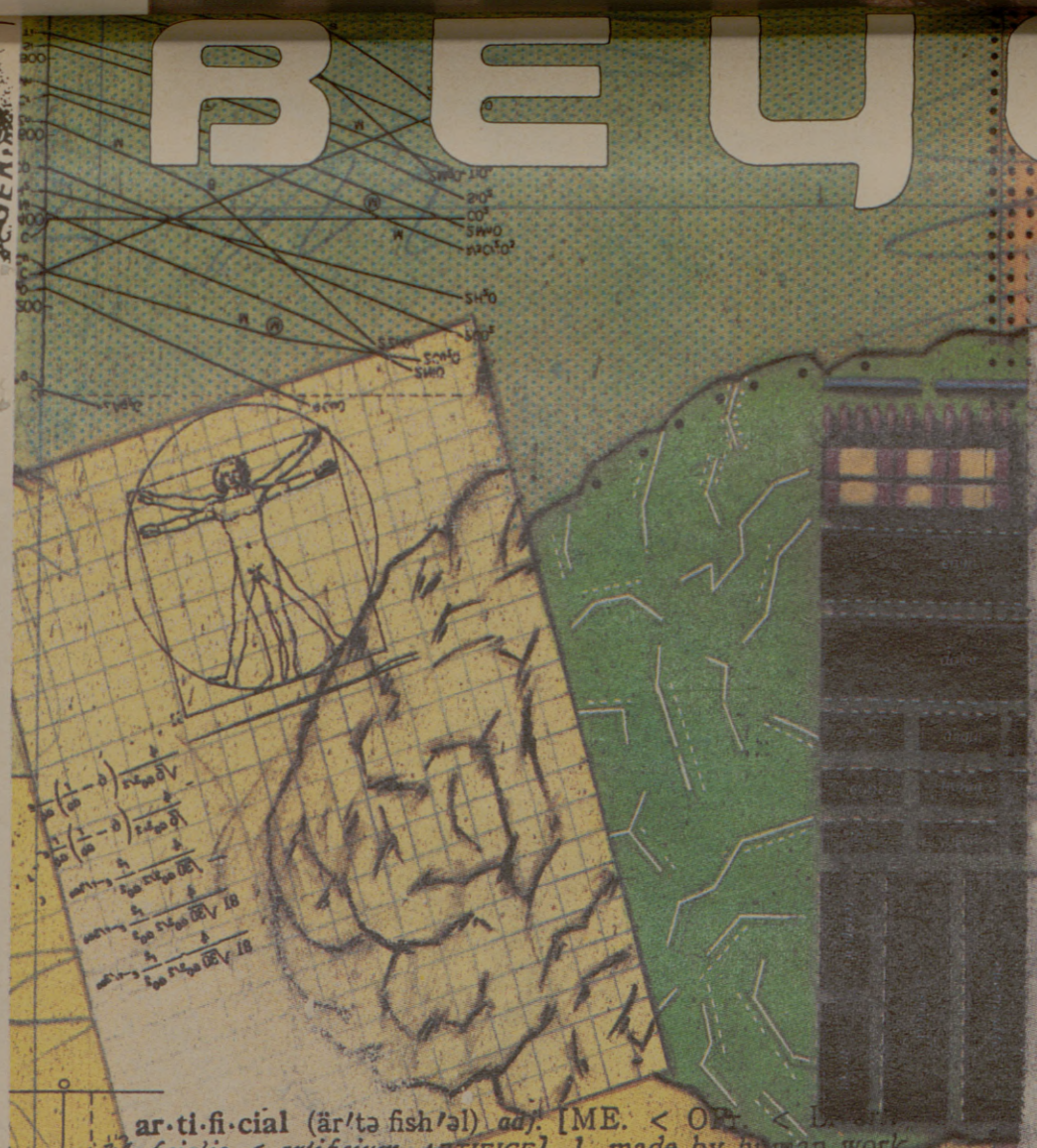
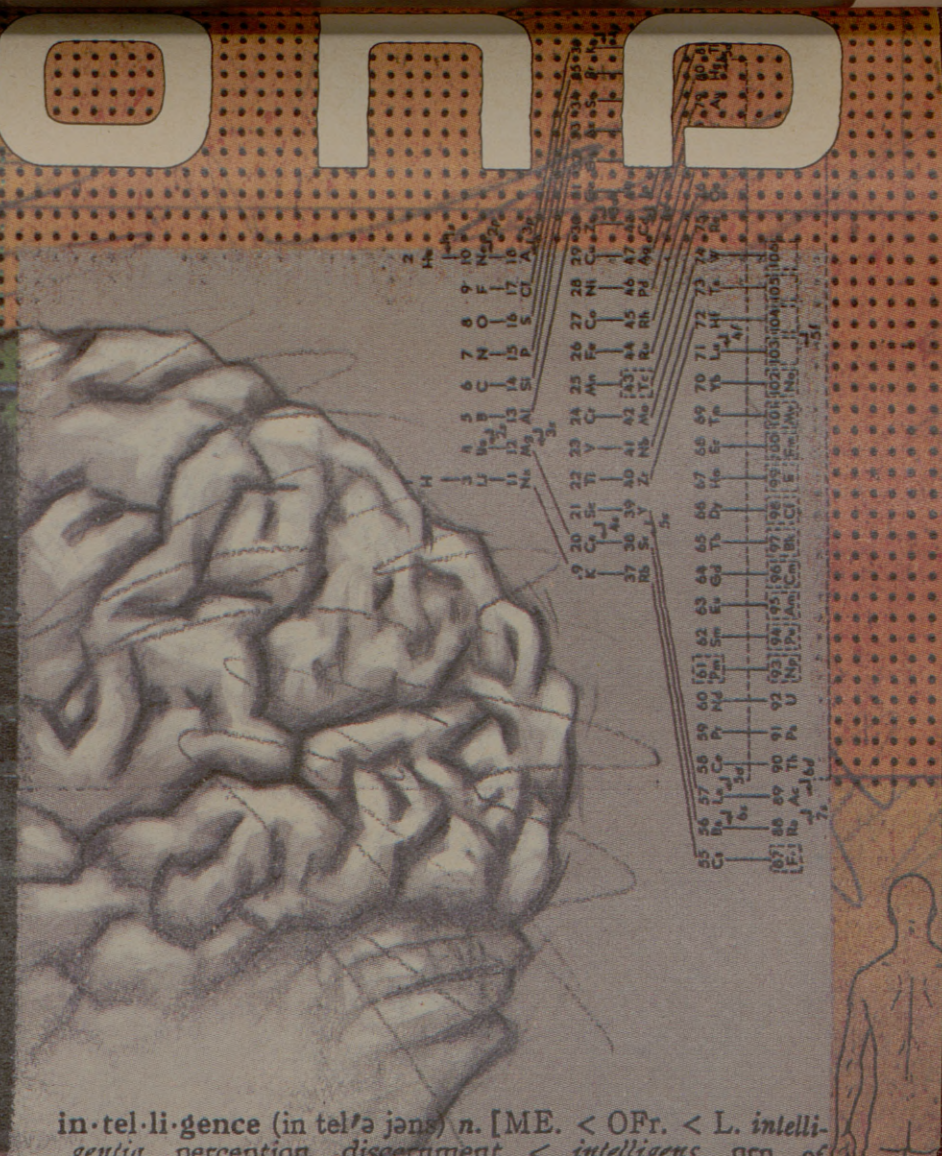


ar·ti·fi·cial (är′tə fish′əl) *adj.* [ME. < OFr. < L. *artificialis* < *artificium*, ARTIFICE] 1. made by human work or art, not by nature; not natural 2. made in imitation of or as a substitute for something natural; simulated *[artificial* teeth*]* 3. unnatural in an affected way *[an artificial* smile*]* 4. pretended; feigned 5. *Bot.* cultivated; not native, as a garden plant —**ar′ti·fi′ci·al′i·ty** (-fish′ē al′ə tē) n., *pl.* **-ties** —**ar′ti·fi′cial·ly** *adv.*



in·tel·li·gence (in tel′ə jəns) *n.* [ME. < OFr. < L. *intelligentia*, perception, discernment < *intelligens*, prp. of *intelligere:* see INTELLECT] 1. *a*) the ability to learn or understand from experience; ability to acquire and retain knowledge; mental ability *b*) the ability to respond quickly and successfully to a new situation; use of the faculty of reason in solving problems, directing conduct, etc. effectively *c*) *Psychol.* measured success in using these abilities

Artificial Intelligence: Mind Games

Computers are becoming so adept at thinking like humans, they are taking over tasks from piloting to diagnosing illness. The really smart technicians will be those who figure out a way to get into this promising field.

By Diana ben Aaron

People used to think computers were just big calculators, but no longer. Today's computers can identify chemicals, understand simple sentences, interpret visual images and diagnose illnesses in people or machines. Tomorrow's computers may even be able to use abstract concepts just as humans do.

The science of making computers perform at this level is called artificial intelligence (or AI for short). AI is already creating a mini-revolution in streamlining microcircuit design and promises to dramatically transform how work is done in fields from magazine layout to factory automation.

Furthermore, it is one of the fastest growing career opportunities in the technical professions.

The major challenge facing those in the field of AI is creating programs and hardware which allow computers to take over tasks (usually repetitive or tedious ones) now done by humans.

To adapt computers to perform at this level, AI designers and programmers must overcome the limitations of their essentially 'dumb' machines. For instance, recognizing a voice or picking up a baseball bat may be child's play for a five-year-old, but getting a machine to do it requires more than wave analyzers and robot arms. "What's missing is the brain," says writer and computing aficionado Jerry Pournelle.

One primary task has been to get computers to think in terms of symbols rather than numbers. Human brains use symbols and relationships rather than numbers, and now, so do computers (except at the lowest levels). The gibberish of early computer languages ("3050: IF X = 1,GOTO 3051") is being replaced by languages made up of symbolic expressions ("ifx [is true]. [then do] y").

AI researchers are using these expressions, which are becoming increasingly like English, to encode problem-solving heuristics (common rules of thumb for thinking), which approximate more and more closely the processes of human thought.

Currently, the most common form of AI is what is called an 'expert system' (although many prefer the terms 'knowledge-based' or 'consultation' system). These are simply large collections of the rules human experts in a field refer to in the course of their work, consciously and unconsciously, defined for the computer.

You might trust a computer program to help *(Continued on page 6)* ▶

SYN.—**artificial** is applied to anything made by human work, esp. if in imitation of something natural *[artificial* hair*]*; **synthetic** is applied to a substance that is produced by chemical synthesis and is used as a substitute for a natural substance which it resembles

ness of mind, cleverness, shrewdness, etc. 2. news or information 3. *a*) the gathering of secret information, as for military or police purposes *b*) the persons or agency