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Remarks: attached is Time article (March) on the SRI para-normal psychology research.

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the "old-boy net" system of hiring, in which department heads (invariably male) ask other department heads for recommendations. A study by a management consultant firm, commissioned by the administration, found major discrimination against women (70% of those with salaries below the minimum set for their category by the consultant firm were women), and recommended pay increases that would amount to \$350,000, if and when implemented. ("Soon," promises the university.)

**Myths.** Trouble is, say the women at U. of M., even those innovations are often sidestepped by a recalcitrant administration. Grievance procedures are slow and cumbersome, and women find it extremely difficult to get the necessary data (such as salary figures) to support their cases. Despite promises to do so, the university has granted back pay because of discrimination in only one case. Although the school will make an effort to determine whether some faculty women are still underpaid for their present rank, it still refuses to consider whether they are underranked because of their sex.

The biggest stumbling block, the women contend, is the sometimes unconscious discrimination evident in male attitudes. Now, when they think they find that kind of discrimination, the U. of M. women immediately challenge it. Part-Time Student Claire Jeannette, appointed to the university staff as "women's advocate," was in a classroom when a professor, in speaking of "the face that launched a thousand ships," commented, "Personally, I've never seen a piece of stuff that looked that good." Jeannette objected to the remark and the professor conceded, "You're right. I'm sorry, dear." ("I should have answered, 'Thanks, darling,'" says Jeannette.) When an economics professor said, "Men work overtime because women make them," she demanded documentation, adding: "I suggest that you don't perpetuate myths unless you have the facts to back them up."

The battle has even been carried to the pages of the *University Record*, the official news organ of the university, which recently printed a poem submitted by James Crump Jr. of the Far Eastern Languages department:

*I think that I prefer to see  
A chairperson who is womanly  
And, if the choice were up to me,  
A fresh person who's a comely she.*

Replied Meryl Johnson, a female research curator at Michigan's Kelsey Museum:

*Indeed we share  
Your appetite for golden hair  
And shapely figures slim and trim  
And do admire a comely him,  
But keep our minds upon our work  
And tolerate each shapeless jerk  
Outranking us in parades  
Who would demand we all be  
flowers.*

### The Magician And the Think Tank

Sprawling over 70 acres of Menlo Park, Calif., the Stanford Research Institute is one of America's largest and best-known think tanks. Its staff of 2,600 highly trained specialists solves problems and does research in nearly every field of human endeavor for both Government and private industry. SRI also does highly classified research for the military, and has worked on counterinsurgency programs in Southeast Asia, explosives technology, chemical and bacteriological warfare and anti-ballistic-missile systems. For its ser-

ROSENBLUM—STARPHOT



ABBA EBAN & GELLER  
Under a cloud.

vices, SRI last year earned revenues of \$70 million. Last week it became apparent that in addition to its other projects, the institute has been seriously investigating the so-called psychic powers of a questionable nightclub magician.

SRI is not alone in investigating psychic phenomena. Indeed, the persistence and growth of that search in an age of science is testimony to the vitality of the concept. But until psychic researchers produce something more than nebulous evidence, skeptics will continue to scoff.

That is precisely what they did when rumors began to emanate from Menlo Park last December. Two men, it seems, had been demonstrating strange and wondrous powers for SRI researchers. One of the men, a 25-year-old Israeli named Uri Geller, was apparently able to communicate by telepathy, detect and describe objects completely hidden from view, and to move or bend objects with his psychic energy. The word among staff members was that SRI

President Charles Anderson, who at first had opposed the project, changed his mind after witnessing demonstrations by Geller.

Later in December, an SRI physicist, Russell Targ, sent a letter to one of the foremost U.S. scientific journals proposing an article on the work of an SRI team engaged in psychic research. Targ said that the subjects with whom he had been working had effected physical changes in laboratory instruments without touching them. Presumably, Targ was referring to such changes as increases in magnetometer readings and the disturbance of electronic systems—all reported to *TIME* by a team member. The research subjects had also demonstrated remarkable perceptual skills, including telepathy. Working further with these men, Targ suggested, would enable SRI to understand psychological phenomena. Written on SRI stationery, the letter also bore the names of the other members of the investigating team: SRI Physicist Harold Puthoff, Kent State University Physics Professor William Franklin and former Astronaut Edgar Mitchell.

Mitchell, who has retired from the astronaut corps and set up his own foundation to investigate psychic phenomena, eagerly confirmed some of the rumors during an interview last month with *TIME*. "I can assure you," he said, "that from [Charles] Anderson down, SRI views Uri Geller as legitimate. They find the results valid and are ready to stand on them." Said President Anderson last week: "Mr. Mitchell does not speak for SRI, and indeed the statement is misleading. Mr. Geller was provided to us as a subject for experimentation. Measurements were made in our laboratories, and the work will stand on its merits."

News of the unusual activity at Menlo Park reached the Department of Defense, and investigators were soon on the scene. One of them was Ray Hyman, a psychology professor from the University of Oregon who is used frequently by DOD as a consultant. Another was George Lawrence, DOD projects manager for the Advanced Research Projects Agency (ARPA). He was accompanied to SRI by Robert Van de Castle, a University of Virginia psychologist and longtime researcher in parapsychology. Van de Castle decided that Geller was "an interesting subject for further study," but neither Lawrence nor Hyman was impressed. After spending a day with Geller and Physicists Targ and Puthoff, Hyman was, in fact, incredulous.

As Geller demonstrated ESP and telepathy (the ability to move or bend objects without touching them) to the delight and excitement of Targ and

Approved For Release 2003/03/28 : CIA-RDP79-00999A000300030021-6

## SCIENCE

Puthoff, Hyman said that he was able to spot the "loopholes and exclusiveness" of each feat. He also caught Geller in some outright deceptions that Targ and Puthoff apparently did not discern.

In one case, Geller asked Lawrence to think of a number between one and ten and to write it down, as large as possible, on a pad. While Lawrence wrote, Geller made a show of concentrating and covering his eyes with his hands. But Hyman, carefully observing Geller, noticed that the Israeli's open eyes were visible through his fingers. Thus Geller was probably able to see the motion of Lawrence's arm as he wrote, and to correctly identify the number, ten. Knowing how to read arm movements, Hyman notes, is important to every magician.

Later, Geller caused a nearby compass needle to turn about five degrees. Lawrence, noting that Geller had moved his body and vibrated the floor, did the same, causing the needle to deflect even more. Geller, startled, accused Lawrence of using trickery, and Targ insisted on examining the DOD man to see if he had magnets hidden in his clothing. (He did not.) Hyman notes that Targ did not feel that it was necessary to search Geller. Hyman's impressions were admittedly based on observations made on a day when normal testing routine was not in effect. Nevertheless, Hyman wrote in a letter to a friend, SRI's tests of Geller were performed with "incredible sloppiness"; the records from previous days, which Targ and Puthoff offered as proof of Geller's powers, were "the most uncontrolled and poorly recorded data I have ever encountered."

**Sensation.** SRI continued to study Geller seriously for another three weeks (for a total of six), filming his feats, paying him a \$100-a-day honorarium and providing him with an automobile and all expenses.

After leaving SRI,\* Geller volunteered to demonstrate his powers to TIME's editors. Last month he appeared at the Time-Life Building in Manhattan and projected thoughts and images, claimed to read minds and caused a fork to bend—supposedly by using psychic energy. After Geller left, Professional Magician James Randi, who had been present, duplicated each of his feats, explaining that any magician could perform them. The fork bending, said Randi, was accomplished by sleight of hand; after distracting his audience, Geller had simply bent it with his two hands.

SRI claims that it was aware that Geller had "detractors" before he arrived in California. Presumably the California scientists knew that he had been something of a sensation in Israel. In 1970, TIME's Jerusalem Correspondent Marlin Levin reports, Geller began appearing before soldiers' groups, in pri-

\*The other psychic, a New York artist named Ingo Swann, is still being studied.

vate homes and on the stage, performing to have psychokinetic powers. At first he was widely acclaimed; he came under suspicion when a group of psychologists and computer experts from Hebrew University duplicated all of his feats and called him a fraud. Eventually, Geller left the country in disgrace.

Even so, SRI insists that its researchers were not duped. "Whether the subject be a saint or a sinner," said an SRI spokesman, "has nothing to do with our measurements concerning the so-called psychical awareness of individuals." How objective those measurements were may well become apparent this week at a Columbia University colloquium in Manhattan, where Targ is scheduled to report on his studies and show a film of Geller in action.



JOSEPHSON AT CAMBRIDGE

## Supercooled Computers

The essential characteristic of all modern computers is speed. Their prodigious memories can be probed with split-second precision; they can race through reams of complex equations with astonishing agility. Their swift skill is made possible by a battery of relatively simple devices, transistors that can turn an electric current off and on in as little as a billionth of a second.

In effect, those switches speak the "yes-no" binary language of computer technology. Their simple answers can be combined to solve intricate problems. But fast as such combinations can be made, computer speed is often not fast enough. The big machines strain to their limit to handle the demands of space travel; they are also too slow to process in time the vast amount of meteorological data necessary to make the detailed and accurate five-day weather forecasts the U.S. Weather Service would like to achieve.

Now help may be at hand. After five years of effort, IBM's researchers have developed an electronic switching device that can be turned on and off in less than ten trillionths of a second

—more than 100 times faster than the transistor used in computers. What is more, IBM's development requires only about one ten-thousandth of the power necessary to run these transistors; it gives off only a tiny fraction of the heat they radiate. And it is transistor heat as much as switching time that limits a computer's skills. For when transistors are packed closer together in order to speed up the flow of signals between them, the risk of overheating is sharply increased.

IBM's switch is based on a phenomenon first predicted in 1962 by a British scientist named Brian Josephson, who was only 22 at the time. While studying superconductivity,\* the Cambridge graduate student determined mathematically that pairs of electrons would "tunnel" through material that is normally an electrical insulator if it

is thin enough and sandwiched between two superconductors. If the flow of electrons through the insulator were kept below a certain critical value, he found, there would be no difference in voltage from one side of the insulator to the other. (At normal temperatures, an electric current never flows unless there is a voltage differential.) Josephson also predicted that if an external magnetic field were applied to the junction, a voltage drop would appear.

Later verified by experiment, the so-called Josephson effect has been widely used to construct extremely sensitive laboratory measuring devices, including a mag-

netometer that can detect fluctuations in a magnetic field only one five-billionth as strong as the earth's. But IBM scientists found a more practical use. They knew that they could produce a voltage drop across a Josephson junction by applying a weak magnetic field; generating that field would require only a fraction of the energy required to switch a transistor. Furthermore, the presence or absence of that voltage across a Josephson junction could be used to represent the same "yes" or "no" information conveyed by a transistor.

For competitive reasons, IBM will not reveal the precise chemistry of the lead alloys used in its junctions. In fact, the company is cautiously refraining from predicting when they will be used in practical computers; many design problems must be overcome before computers can be built to operate at superconducting temperatures. Nonetheless, IBM's laboratory triumph and continuing research by the world's largest computer manufacturer suggests that high-speed, supercooled electronic computers may be a reality in the future.

\*The disappearance of electrical resistance in certain materials when they are cooled to within a few degrees of absolute zero ( $-459.7^{\circ}$  F.).