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Catalyst

FOR ENVIRONMENTAL QUALITY

Vol. II, No. 1

CATALYST is dedicated to the new conservation. It is concerned with the total environment.

We aim to help educate people to the threats to their environmental well-being and the need for a change of attitude to quality rather than quantity values. This to insure that future generations do not inherit an environmental wasteland.

Since it is one of the ironies of our fabulous age of technological advances and scientific discoveries that there are now available to man more answers to his problems than there are users of those answers, another of our aims is the transfer of know-how.

To this end CATALYST also relays pertinent news and views of leaders in the field, so that, by serving as a kind of transmittal belt, we may be a catalytic influence in getting relevant knowledge, research and skills put to use.

While our focus is primarily national, our concerns are world-wide. For degraded environment is no respecter of boundaries. We are all fellow passengers on the "spaceship earth" and have equal responsibility for maintaining its environmental quality.

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You can help in the fight for environmental quality if, after reading CATALYST, you pass it on to someone who also should be concerned.



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Russell E. Train has been Chairman of the Council on Environmental Quality since its creation on January 30, 1970. He came to this prestigious environmental post following more than a decade of activity in conservation work.

After a 1956 safari to Africa, Mr. Train founded the African Wildlife Leadership Foundation to train Africans in wildlife resource management. From 1965-9, he was president of the Conservation Foundation. Then he served for a year as Under Secretary of the Interior with environmental responsibilities.

Born in Washington, D.C. in 1920, Russell Train graduated from Princeton (B.A.) and later got a law degree from Columbia. In his first career he was a tax specialist, serving in the executive, legislative and judicial branches of the Federal government. In 1957, Mr. Train was appointed a judge of the Federal Tax Court, a post he held until 1965 when he moved over into conservation work.



Ian L. McHarg is a practicing landscape architect, regional planner, professor, writer, and lecturer, who holds the Chair of Landscape Architecture and Regional Planning at the University of Pennsylvania.

He is one of America's foremost advocates of the ecological approach in designing tomorrow's cities and countryside, and his most recent book, "Design with Nature," spells this out.

Born in Clydebank, Scotland, Mr. McHarg has received from Harvard a Master's Degree in Landscape Architecture and the degree of Master of City Planning. He holds honorary doctorates from Amherst College and Lewis and Clark College.

Among the awards he has won are the Horace Albright Memorial Lectureship at the University of California, the Distinguished Science Lectureship at Brookhaven National Laboratory, and the Bradford Williams Medal awarded by the American Society of Landscape Architects.



Gaylord A. Nelson, Democratic Senator from Wisconsin, has been an environmentalist throughout his political career. He was national co-sponsor of Earth Day, and has introduced a wealth of environmental proposals for legislation.

Those signed into law include: establishment of criteria for maximum limits on pesticides as part of the inter-state water quality standard program, establishment of environmental education programs, creation

of economic incentives for recycling of packaging and other solid wastes, an amendment to the anti-poverty program which puts the unemployed and elderly to work on conservation projects.

Born in Clear Lake, Wisconsin in 1916, Gaylord Nelson graduated from San Jose State College, California, and received a law degree from the University of Wisconsin. He has received honorary degrees from Wisconsin's Beloit College, Northland College, and Lawrence University.

Following four years of Army service in World War II, he entered politics and served in the Wisconsin State Senate for 10 years. From 1958-62, he was Governor of Wisconsin, and since 1962 he has been a U.S. Senator.



Cleve Backster, founder and director of the Backster Research Foundation, has been a polygraph (lie detector) expert since 1948.

He has served as an interrogation specialist with the Central Intelligence Agency and the US Army Counterintelligence Corps, and as a polygraph consultant to many government agencies.

He is the founder and operator of The Backster School, the first non-military polygraph school to conduct advanced courses in polygraph usage. And he has pioneered in utilizing psychogalvanic reflex instrumentation for stress monitoring purposes other than the detection of deception.

Born in Lafayette, N.J. in 1924, Cleve Backster studied civil engineering, agriculture, and psychology at Texas University, Texas A & M, and Middlebury College.

As chairman of the Research and Instrument Committee of the Academy for Scientific Interrogation for eight years, he contributed a new technique component which materially reduces the number of inconclusive polygraph examinations.



Ian MacGregor, Chairman and Chief Executive Officer of American Metal Climax, Inc., joined the company in 1957 as vice president. He became president in 1966 and was elected Chairman of the Board in 1969.

Born and educated in Scotland, Mr. MacGregor received degrees in metallurgy from the University of Glasgow and the University of Strathclyde. He also holds honorary degrees from the Montana College of Mineral Science and Technology (Doctor of Laws), and from Tri-State College (Doctor of Science).

Mr. MacGregor is a director of many companies, and serves as a board member of The Conference Board, Inc. He is a member of the Mining and Metallurgical Society of America and the Society of Automotive Engineers, and is an associate of the Institute of Mechanical Engineers, London.

PLANTS DISCOVERED TUNING IN ON US

CATALYST Editor, Vivian Fletcher, interviews Cleve Backster, the polygraph expert who has discovered that plants read people's minds, react to death of other living things, feel pleasure and pain, "faint", and remember.

Vivian Fletcher: Mr. Backster, I understand that plants here in your Backster Research Foundation laboratory have been exhibiting very strange behavior. That they "cry out" when live shrimps are dumped in boiling water. That they sense people's intents. That they "faint" when someone they fear is near. That they "yelled" ouch when you accidentally cut your finger and put iodine on it. And that they seem to have "memory," and respond to Pavlovian conditioning. Are these things really true?

Cleve Backster: As a scientist, I would more cautiously describe some of the capabilities you are suggesting, although the plants we are working with are showing us some amazing perceptions not previously known to exist. This is not peculiar to those here in my lab, however.

Fletcher: You mean the plants I have in my apartment also have "feelings?"

Backster: I strongly suspect they do. The only thing different about our plants is that we are able to hook them up to polygraph instrumentation and get meaningful readings recorded on the moving chart paper. This allows us to conduct scientific experiments with our plants and offer evidence of their reactions.

Fletcher: You're a polygraph expert, aren't you?

Backster: Yes, I've spent some 23 years in behavioral studies on human beings, using the polygraph or so-called lie detector.

Fletcher: But more recently you've also been doing polygraph studies on plants, I understand.

Backster: For the past five, almost six years. And the plants have not only provided us with unique information about themselves; they have led to other discoveries.

Fletcher: Such as what?

Backster: Well right now we're doing some fascinating research on chicken eggs, thanks to a plant reaction.

Fletcher: You mean one of your plants told you something you didn't know about an egg?

Backster: Something that could have profound implications for origin-of-life research.

Fletcher: Can you tell me about it?

Backster: I don't like to talk about things while they're still in the experimental stage, but I can tell you about some of our preliminary observations.

I used to have a doberman pincher, and I'd bring him here to the lab with me. Each night when I fed him I used to add the yoke of an egg to his food. It's supposed to be good for a

dog's coat. Well, one night I was monitoring a plant's reaction about 20 or 30 feet from where I was feeding the dog. To my amazement the plant showed a strong reaction just as I cracked open the egg.

Fletcher: Something had upset the plant?

Backster: Right. The next night I watched closely while going through this egg-breaking routine, and again the same thing happened. Now the idea of a plant reacting to the cracking open of an egg was awfully interesting to me. It seemed that the plant was providing a valuable clue. I then decided to attach the polygraph electrodes directly to an unbroken egg and I succeeded in obtaining a nine-hour recording from one

Fletcher: Recording?

Backster: A written chart readout from the polygraph. Well, a portion of that reading showed me something pretty startling. Though this was a non-incubated, fresh egg, the chart showed what seemed to be a heartbeat. There was a frequency — about 160 to 170 beats per minute — appropriate for a chicken embryo between three and four days along in incubation. And there was no other way to account for this frequency. But when we afterward opened up the egg and carefully checked the contents, we found absolutely no physiological evidence of a chicken embryo.

Fletcher: That's fantastic! What conclusions do you draw from it?

Backster: No conclusions. This was an observation. It did appear that we might be tapping into some kind of force field that could be providing the rhythm and guiding the development at a pre-embryo stage — a force field that is not conventionally understood within our present body of scientific knowledge.

Fletcher: And you say you're now doing further research on this?

Backster: Yes, and we are finding that the heartbeat frequency shown in the original recording is a repeatable observation.

Fletcher: How does your egg research relate to the polygraph research?

Backster: It seems to add weight to the idea that communication capability exists among all living things. I remember it was the plant which first indicated awareness when the egg was broken. And, of course, in the various phases of our plant research we get consistent indication of strong plant reaction to the death of living organisms, even isolated living cells. One day when I happened to cut my finger, for example

and put iodine on it. The plant that was being monitored by the polygraph immediately reacted to the death of some form of human cell life.

On another occasion I was about to eat a cup of yogurt here in the lab. You know how the jam is down at the bottom of the container. Well, just as I stirred the jam into the yogurt, a strong plant reaction showed on the polygraph chart. This puzzled us until we realized that there was a chemical preservative in the jam and this was terminating the yogurt cells. What we were getting from the plant appeared to be another reaction-to-death chart reading.

Also, in our original experiment, live brine shrimps were dropped into boiling water and at the moment this occurred the monitored plant at the other end of the laboratory registered a reaction on the polygraph chart.

Fletcher: So the shrimps or the yogurt cells or the tissue cells in your finger — whatever is dying — must send out a message of some sort which the plant picks up and records.

Backster: Slight correction. I would say whatever is abruptly *killed* must send out a message. A more orderly dying involves some preparation for death, and we've found that where this occurs there is little if any plant reaction.

Fletcher: That seems a strange distinction.

Backster: Maybe not. It may be that what the plant is reacting to is sudden disorientation — disorganization from a natural state of being.

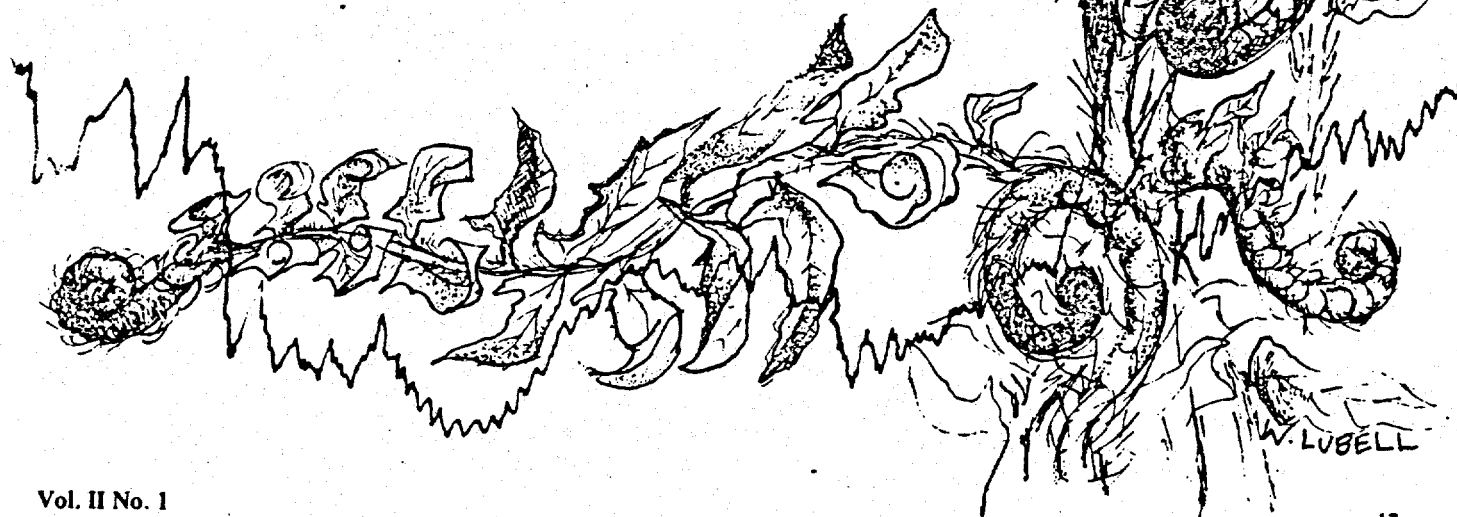
Fletcher: That could have ecological implications, of course. And I want to get into this. But first, what got you started on this strange adventure with plants? What made you think they might know things nobody guessed?

Backster: Well, it goes back to 1966. February 2nd, to be exact. I remember the date well because from then on a great deal about my life changed. Before that my full-time activity had been use of the polygraph in testing people. I had been an interrogation specialist with the U.S. Army Counter-intelligence Corp., a polygraph specialist with the Central Intelligence Agency, and I had founded the Backster School which conducts polygraph examiner training courses.

Fletcher: That's lie detection, you said. Would you explain how the polygraph works — with people and with plants?

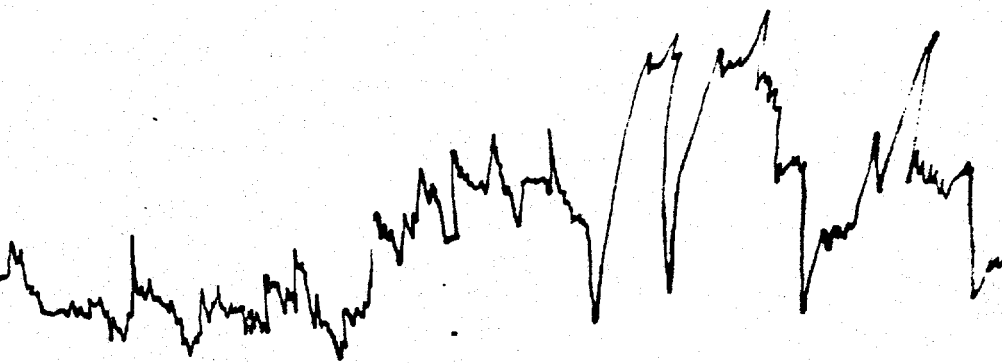
Backster: Briefly, when testing people most polygraphs record three types of changes — the breathing pattern, the heart activity, and changes in the electrical properties of the skin, which is called galvanic skin response or psychogalvanic reflex. It is this last portion of the polygraph that we have been using on plants.

When testing humans, electrodes are attached to each of two fingers. With plants, the electrodes are attached to each side of a leaf. Basically, when testing people we rely on reactions accompanying threat-to-well-being. This occurs when a person faces discovery when attempting deception to a question about a crime.





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Fletcher: So on this day in February, 1966 . . .
Backster: I had stopped work to water a plant – that dracena over there – and the thought popped into my mind to hook it up to a polygraph nearby.
Fletcher: Why?
Backster: I wanted to see if I could find out how long it took moisture to get from the roots of the plant to the leaf area. So I placed electrodes on both sides of a leaf and then watched the polygraph chart – not really expecting there would be any tracing changes at all.
Fletcher: But there were.
Backster: There not only were but the pattern was not unlike human tracings. That was surprise number one. After watching the chart tracings for a few minutes, I said to myself, I'll try to cause it to react by somehow threatening its well-being. I decided to burn the leaf that had the electrodes on it. Well, that was the moment! Before I could reach for a match – at the split second that I had the image of fire in my mind the recording pen bounded right off the top of the chart.
Fletcher: You mean the plant read your mind?
Backster: That's exactly what seemed to happen. I'm not one to jump to conclusions but what I observed really shook me up. Being a scientist, the first thing I had to do was to make sure I had not overlooked a logical explanation of the occurrence. So I started checking things out. Maybe this particular plant was somehow extraordinary. Maybe there was something peculiar about me. Or was there something unusual about the polygraph instrument, the room, the location? No. Other people using other plants in other places, were able to make similar observations. Plants not only seemed aware of people and reacted to them; plants could apparently sense intent! Moreover – and this not only confounded me, but also scientists from many disciplines whom I invited to come and observe the phenomenon – physicists found they could not block out the apparent transmission.
Fletcher: What do you mean by "block out"?
Backster: This was an attempt to isolate that portion of the electro-magnetic spectrum involved in some form of transmission between a human and the plant. All types of shielding were used, but none successfully interrupted the transmission.
Fletcher: You said you conducted experiments on other plants and in other places. Would you be more specific?
Backster: I tested plants in different parts of the United States and overseas in Lebanon when I traveled to conduct tests or to attend meetings of polygraph experts. The charts I obtained were always similar.
Fletcher: You use the same polygraph equipment that's used for humans and you clamp the electrodes on each side of a plant leaf. Doesn't that limit you to plants whose leaves are fairly thick?

ster: No. So long as the plant leaf is large enough to be the surface of the electrodes and tough enough so the needles don't press through the leaf and short out, most any plant can be tested. During initial observations, we tested 30 different varieties. We've also found that other types of vegetation will show meaningful tracings.

her: Such as?

ster: Lettuce, onions . . . in fact, just about any kind of vegetable. Also, most types of fruit.

her: Have you had polygraph evidence of plants reading people's minds? I mean, other than your own mind?

ster: We have made some interesting observations that point in that direction. On one occasion, for example, a scientist who is a plant physiologist visited our lab. While he was present the plants did something similar to

her: Fainting?

ster: What we'd call fainting in a human. The plants were reacting quite typically before she arrived — fluctuating patterns — but while she was in the room they were able to obtain was a straight line. It was downright amazing. She'd made the visit to our lab to see for herself what reactions she'd read about. One at a time, I hooked up different plants and couldn't get anything but a straight line out of any of them. Finally the sixth plant did respond so I was somewhat vindicated. But before she left her, "Just what is it you do with plants in your experiments? Do you hurt them in any way?" And she said, "I put them in an oven and roast them in order to get their dry weight for my data."

her: She was a plant killer and the plants knew it, so she passed out?

ster: Well, that's one interpretation anyway. It doesn't mean anything. But it may point a direction for further study. Thirty minutes after she left, I attached each of the five plants that had shown only a straight line and each then showed excellent reaction capability.

her: Have the plants appeared to "faint" in any other situations?

ster: Yes. One situation involves preliminary work on a research project we have under way to see if we can condition plants — if they can be conditioned by association to a sense of memory.

her: You mean Pavlovian experiments such as that dog which salivated when a bell rang even though he never fed at the time of the signal?

ster: Yes, but I don't want to get into the details of the experiment until after its completion.

her: But is there any evidence that plants have memory?

ster: Not what can be called evidence in a strict scientific sense. But we've seen some indications that they might have it. For example, in our brine shrimp tests a plant would show no reaction to the death of the shrimp after the fourth time it occurred. They appeared to adapt — they have memory.

her: It certainly does!

Backster: On our project to see if we can teach plants, at the beginning I was using an electrical impulse on them as a conditioning threat-to-well-being. Because of the crudeness of the particular equipment, it turned out that I was giving them a stronger shock than I intended, and this too produced a straight-line "faint" recording. It got so that when I merely *thought* of using that electrical impulse on them, the plants would "faint." This caused me to change to a "reward" basis instead.

Fletcher: If plants are capable of all the things we've been discussing, we must obviously view them differently. I'm reminded of a friend of mine. She has so much love for animal life that she won't eat meat or fish. When she learns this about plants and other vegetative forms she'll probably feel she shouldn't eat greens and vegetables either.

Backster: I don't see that our uncoveries are any threat to vegetarians. It may be that a vegetable appreciates becoming part of a higher form of life rather than rotting on the ground.

Fletcher: Do you think a plant feels Man is a higher form?

Backster: I don't know about that, but it's very interesting that plants will adapt to death of all kinds of living cells we've tested except one. They do not adapt, in our experience, to recurring death of *human* cells.

Fletcher: Could you do some experiments to find out the reaction of, say, a lettuce leaf to being eaten? The attached electrodes wouldn't seem to be a problem because if the leaf can read the tester's mind, he wouldn't have to really eat it; he could just *think* of eating it.

Backster: Ah, but there we get into something else that's very interesting. We've seen this repeatedly in our experiments. The plant senses intent. Intent is real. If we merely pretend



that we're going to do something, we get no reaction from the plant whatsoever. Whatever it is they're tuned in to, this is true. You can't fool it.

Fletcher: I gather you also feel that plants have a special affinity for their owners?

Backster: It's certainly true in my experience. Take this dracena plant, for example. I do a lot of lecturing and I often project a color slide of this plant because it's the original one we tested. When I show the slide and speak fondly about the plant there's a time correlation with a reaction by the plant back here in the lab, if we have the polygraph equipment activated.

Fletcher: No matter how far away you are?

Backster: Distance doesn't seem to have any bearing.

Fletcher: Maybe when a person goes off on vacation and leaves her plants in the care of a neighbor, she should take along a picture of the plants and look fondly at it occasionally, so they don't wither and die, as so often happens when under someone else's care.

Backster: I frequently suggest just that.

Fletcher: Are you serious? I was being facetious.

Backster: I'm serious. It wouldn't be the picture that does good, of course. It's your thinking about the plant, which then appears to know it hasn't been abandoned by you. Remember, it's attuned to your thoughts.

Fletcher: Is this a kind of extrasensory perception on the part of the plant?

Backster: It may be even more basic. When we use the term ESP we are referring to perception above and beyond the established sensory perception of touch, sight, hearing, smell, and taste. With plants, the perception registered is apparently not extra-sensory but part of their basic sensory equipment. Which is all the more extraordinary. For this reason, I use the term "primary perception."

Fletcher: Do you agree with the people who say it helps plants flourish if you talk encouragingly to them?

Backster: I occasionally lecture to garden clubs and these people tell me it definitely helps. I suspect they are right.

Fletcher: Maybe that's the real secret of people who have "green thumbs." They simply have better communication with their plants.

Backster: Quite likely. Plants also seem quick to pick up negativism. We've never done formal experiments on this, but many people have told me that plants don't grow well in homes where there's a lot of dissention.

Fletcher: That relates to what you said earlier about plant agitation over death possibly being due to disorganization or disunity. And this makes me think of such environmental

disorganizers as air and water pollution. Ecologists are constantly trying to alert us to the fact that all forms of life are irrevocably interrelated. That we can't do damage to one element of our biosphere — air, water, earth, fire, or fauna — without it having destructive repercussions on everything else. What strikes me most about your research is that plants have sensory perception, and that there must be some form of communication among all living things. That it offers startling documentation of the ecological viewpoint.

Backster: There's no doubt in my mind that we are all one.

Fletcher: Is that perhaps what your research is really directed at — trying to establish the oneness of all life forms?

Backster: There are many scientists working on various aspects of this. Our work may make a contribution. We certainly hope so. What we're involved in doing is expanding the scope of the present-day body of scientific knowledge. The things we're uncovering here most scientists wouldn't even hypothesize. But in our approach we're adhering strictly to the scientific method.

Fletcher: Do many scientists inquire about your work?

Backster: Oh yes. As a matter of fact, over 7,000 scientists have requested reprints of our first published experiment — some from abroad. We try to provide as much information as possible. We want to do everything we can for scientists to point them in a direction and then have them go off on their own and do as much as they want.

I personally have seen too many examples where there is a tendency to put a "top-secret" stamp on research, and others are deprived of the benefits. Here we try to make public disclosure of the methodology and results of our research as fast as possible, so we don't have people running to get patents on this sort of thing. It's too profound for that. I think this is something for all humanity.

Fletcher: Do you get many expressions of interest from the general public?

Backster: So many we can't keep up with the mail or fill all the requests for lectures. This thing interests a very broad cross-section of people — young people, military establishments, garden clubs, theologians, scientists and, of course, ecologists. Being that kind of a focal point, our work can help develop the oneness idea.

If mankind can more completely appreciate the interrelated complexity, beauty, and sentience of his environment, perhaps he will be more considerate in his own personal relationship with it.



The plant in the cover photo certainly can't scream in the true sense of the word. But according to engineer Cleve Backster, plants and even single cells may be able to give off distress signals that can be picked up by an instrument called a polygraph (lie detector). Now before you fall out of your chair, there's more.

Would you believe that onions and carrots give off distress signals while being chopped up for a salad; and your mother's favorite African violet reacts when someone in the house strikes a match?

Ridiculous? Unscientific? Maybe, but according to Mr. Backster the plant pictured on the cover may actually be emitting distress signals because it is afraid of fire.

It happened like this.

One day while watering an office plant, Mr. Backster wondered if his polygraph could measure how fast water moves up the plant stems to the leaves. The engineer attached the polygraph electrodes to the plant leaves and waited.

After a time he noticed something unusual. The polygraph tracing was similar to the ones humans make when emotionally upset.

He decided to test this observation further. Mr. Backster dipped a plant leaf into a cup of hot coffee. Nothing happened. He decided to strike a match in front of the plant.

The moment this *thought* crossed his mind, the polygraph needle jumped to a high peak similar to those formed when a person tells a lie. The actual striking of the match produced the same response.

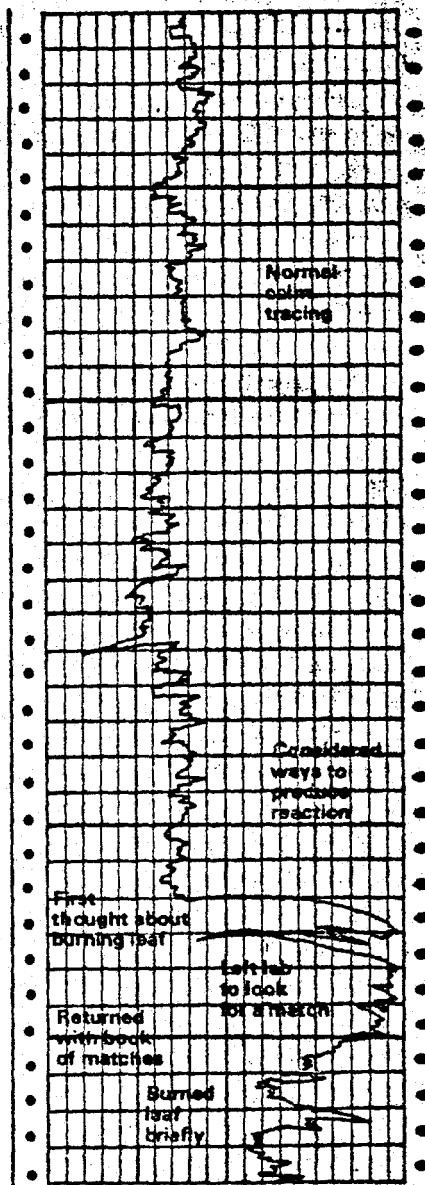
Could it be that the plant was able to read the experimenter's mind and respond emotionally? Mr. Backster thinks it could be. He is spending a great deal of time and money trying to find out.

After reading this account, you are probably shaking your head in disbelief. Come on now, plants just don't behave this way! How would

other scientists view these findings?

A Closer Look

Mr. Backster is *guessing* that the plant response revealed by his polygraph is a distress signal. He is basing his experiments on this guess, or hypothesis. To him this hypothesis seems to be the most reasonable



This is a polygraph tracing showing a plant's reaction to a fire stimulus. High peaks drawn by the needle indicate the strongest reactions. A human shows the same kind of tracing when emotionally upset.

one because what he sees indicates a clear case of cause and effect.

But as Mr. Backster and all other scientists know, his hypothesis could be wrong. The hypothesis will have to be tested by other scientists at other laboratories.

It may also be possible that Mr. Backster is observing a correlation of events and not a case of cause and effect at all.

For example, a train moving down a track generally makes a lot of noise. And when no noise is heard, the train is usually motionless.

Is the noise causing the train to move? A person seeing a train for the first time might think this to be a reasonable deduction. But someone familiar with trains would recognize this as a faulty conclusion made from a limited observation.

Problem Solving

Like most scientists, Mr. Backster has taken on a knotty problem to solve. But scientists aren't the only people who have difficulty with problems. We all have this difficulty. Often we are less exacting than scientists. Sometimes our answers are based more on fancy than on fact. Let's consider an example.

Man is subject to a variety of diseases. Among these is the crippling disease called arthritis. Scientists all over the world are trying to find a cure. In the meantime, some individuals have sought their own cures. One such supposed cure is to wear a copper bracelet on the wrist. The green stain left on the wrist is thought to have curative powers. This "remedy" has become so popular that people wishing to try it can now go into a jewelry store and choose a cure-all bracelet from a wide selection of styles.

How would you go about proving or disproving this belief? What hypothesis would you start out with? Could any experiments be used to test the hypothesis?

Managing Editor: Morton Malkowsky Editor: Vincent Marteka Staff Writers: Jacqueline Harris, Erwin A. Steinkamp

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Note for Plant Sensors File

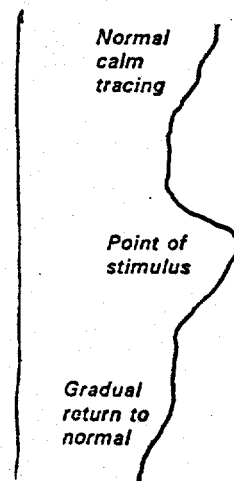
Beckster seems to have succeeded in ~~demonstrating~~

developing techniques for using living plants to sense several forms of energy including thermal, ~~radio~~ IR radiation and acoustic. Some of the evidence may also be attributable to humidity, ^{changes} and air ~~also~~ currents.

If he has advanced the state-of-the-art in coupling electronic devices to living plants we may do well to ^{recognize} ~~consider~~ such advances. ~~for further~~ ^{The application} ~~Further development~~ of these

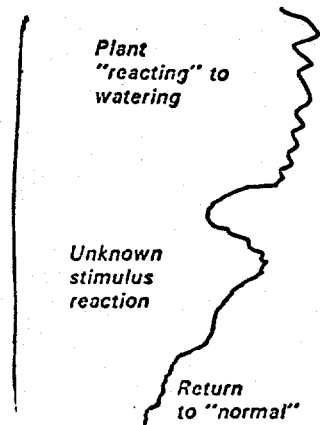
Techniques to ~~collect~~^{ward} of intelligence
objectives may be ~~successful~~ accomplished
by engaging individuals qualified in
the disciplines of electronics and botany.

Clive Backster's polygraph says plants feel apprehension, fear, pleasure and relief. Has he found an unknown kind of communication that links all living things?

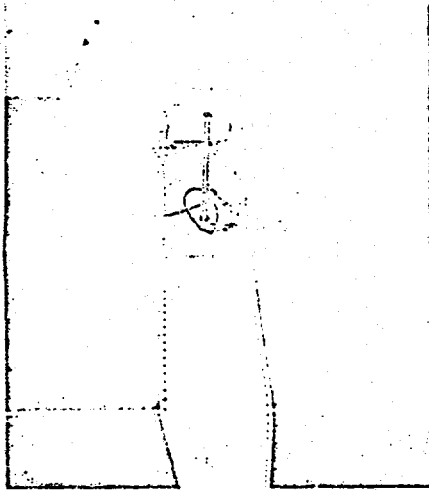


Above, a typical PGR (psychogalvanic reflex) reading from a polygraph of a human test subject experiencing a deliberate emotional stimulation. The chart passes under the stylus at the rate of six inches per minute; each horizontal division represents five seconds.

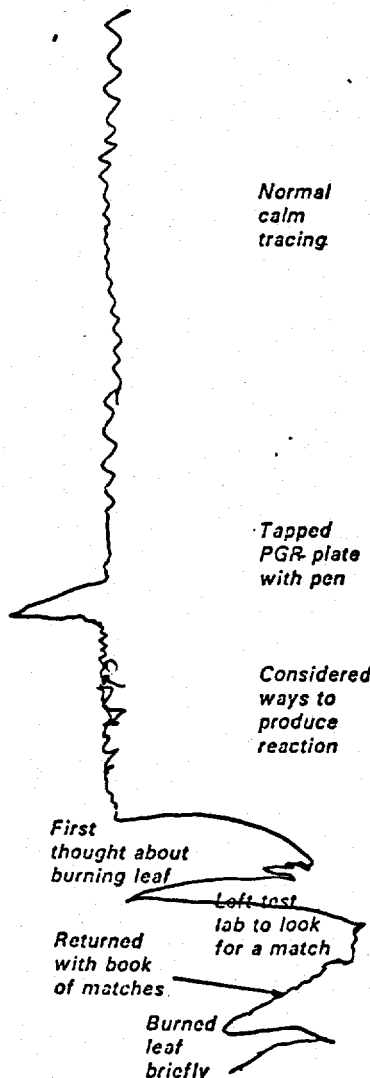
Below, Backster's first reading from a plant, a *dracena massangeana* being watered on February 2, 1966. The upward tracing in the center of the chart was his first suggestion of some type of arousal reaction from the plant.



BY THORN BACON



Further tracing from Backster's experiment of February 2, 1966, showing his first deliberate stimulation from a test plant. Backster regards it as significant that his intent to harm the plant produced a stronger reaction (anxiety?) than the actual burning.



SUPPOSE you were to be told that the philodendron plant resting on the window sill above your kitchen sink screams silently when you break a breakfast egg in the frying pan, or that the potted drecena on the sun porch grows apprehensive whenever your dog goes by?

Finally, would you dare believe that when you accidentally cut your finger the dying cells in the drying blood transmit signals to the philodendron, the drecena and the parsley in your refrigerator?

Provocative questions? Indeed, yes, but ones which are being seriously, soberly and quietly investigated by scientists at several major American universities as a result of some bizarre findings by the Backster Research Foundation of New York City.

The object: To discover if there is an unknown communication link between the cells of plants and animals through which distress signals are transmitted that broadcast threats against any member of the living community!

These staggering implications were reported in an abstract published on September 7, 1967, by Cleve Backster, a former interrogation specialist with the Central Intelligence Agency, who operates a New York school for training law enforcement officers in the techniques of using the polygraph—commonly known as the lie detector.

Backster was one of a four-man panel of experts called to testify before the 1964 Congressional Hearings on the Use of Polygraphs by the Federal Government. Following duty with the CIA as an interrogation specialist, he became director of the Leonarde Keeler Polygraph Institute of Chicago. Since 1949, he has acted as a consultant to almost every government agency which makes use of the polygraph. He introduced the Backster Zone Comparison polygraph procedure, which is the technique standard at the U. S. Army Polygraph School.

Changed his life. Teaching polygraph, however, became a secondary interest to Backster on a February morning in 1966 when he made the discovery which changed his life.

These are the words he used to describe what happened in his laboratory that morning:

"Immediately following the watering of an office plant, I wondered if it would be possible to measure the rate at which water rose in a plant from the root area into the leaf. I chose the psychogalvanic reflex (PGR) index as a possible means of measuring the rate of moisture

ascend. The pair of PGR electrodes could be attached to a leaf of the plant. Hopefully, by using the Wheatstone bridge circuitry involved, I could measure the increase in the plant leaf's moisture content onto the polygraph tape.

"Deciding to pursue the idea, I placed a psychogalvanic reflex electrode on each side of the same leaf of the nearby *Draena Massangeana* plant with a rubber band. The plant leaf was successfully balanced into the PGR circuitry, its electrical resistance falling within the resistance limit of the instrumentation.

"Contrary to my expectation, from the outset the plant leaf tracing exhibited a downward trend. Then, after

"Staggering as it may be to contemplate, a life signal may connect all creation..."

about one minute of chart time, the tracing exhibited a contour similar to a PGR reaction pattern typically demonstrated by a human subject experiencing an emotional stimulation of short duration. Even though its tracing had failed to reflect the effect of the watering, the plant leaf did offer itself as a possibly unique source of data.

"As I watched the PGR tracing continue, I wondered if there could be a similarity between the tracing from the plant and a PGR tracing from a human. I decided to try to apply some equivalent to the threat-to-well-being principle, a well-established method of triggering emotionality in humans. I first tried to arouse the plant by immersing a plant leaf in a cup of hot coffee. But there was no measurable reaction.

"After a nine minute interim, I decided to obtain a match and burn the plant leaf being tested. At the instant of this decision, at thirteen minutes fifty-five seconds of chart time, there was a dramatic change in the PGR tracing pattern in the form of an abrupt and prolonged upward sweep of the recording pen. I had not moved, or touched the plant, so the timing of the PGR pen activity suggested to me that the tracing might have been triggered by the mere thought of the harm I in-

ended to inflict upon the plant. This occurrence, if repeatable, would tend to indicate the possible existence of some undefined perception in the plant."

Backster began to explore how the suffering of other species affected his plants. He bought some brine shrimp, ordinarily used as live food for tropical fish, and killed them by dumping them into boiling water. As he saw the polygraph recording needle leap frantically, he was awed by a startling and apparently new concept: "Could it be that when cell life dies, it broadcasts a signal to other living cells?" If this was so, he would have to completely automate his experiments, removing all human elements which might consciously or unconsciously contaminate the results.

Space age lab. In the three years since, Backster has spent many thousands of dollars in transforming his offices into a space-age assembly of mechanized shrimp-dump dishes, a sophisticated electronic randomizer and programmer circuitry and multiple PGR monitoring devices. But the results continue to point to a capability for perception in all living cells — a perception that Backster calls "primary". I asked him for more details:

Q. What do you mean by primary?

A. I mean primary in the sense that this perception applies to all cells that we have monitored, without regard to their assigned biological function.

Q. What types of cells have you tested?

A. We have found this same phenomenon in the amoeba, the paramecium, and other single-cell organisms, in fact, in every kind of cell we have tested: fresh fruits and vegetables, mold cultures, yeasts, scrapings from the roof of the mouth of a human, blood samples, even spermatozoa.

Q. Do you mean that all of these cells have a sensing capacity?

A. It seems so. Incidentally, we have tried unsuccessfully to block whatever signal is being received by using a Faraday screen, screen cage, and even lead-lined containers. Still the communication continues. It seems that the signal may not even fall within our electrodynamic spectrum. If not, this would certainly have profound implications.

Q. What kind of a signal is it?

A. I can answer your question better by telling you what we think the signal

is not. We know it is not within the different known frequencies, AM, FM, or any form of signal which we can shield by ordinary means. Distance seems to impose no limitation. For example, we are conducting research that would tend to indicate that this signal can traverse hundreds of miles.

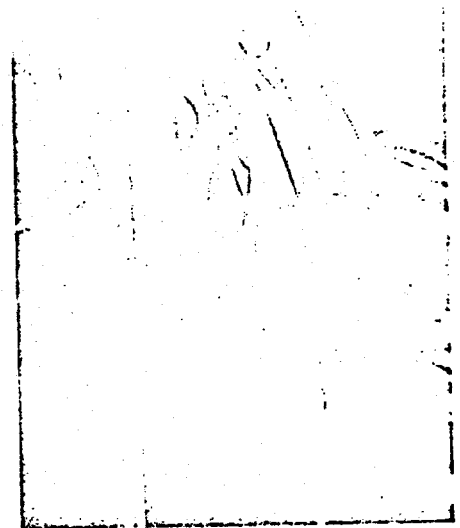
Q. Are plants attuned to stress?

A. Perhaps. I used to have a Doberman Pincher in my office. He slept in the back room where I had an electric timer hooked to a loud pulsating alarm, which was located directly above his bed. Actuation of the timing mechanism was accompanied by a barely audible click which preceded the alarm by approximately five seconds. The dog would invariably hear the click, and would leave the room before the bell, which he disliked intensely, started to ring. Although in a different room, with the plants, I knew exactly when the dog was leaving his room, even though I could not hear the click, because the plants acknowledged his movements by showing reaction coincidental to the click, reflecting the Doberman's anxiety.

Q. In the final analysis, aren't you saying that we must re-assess our definitions of sensory perception and intelligence?

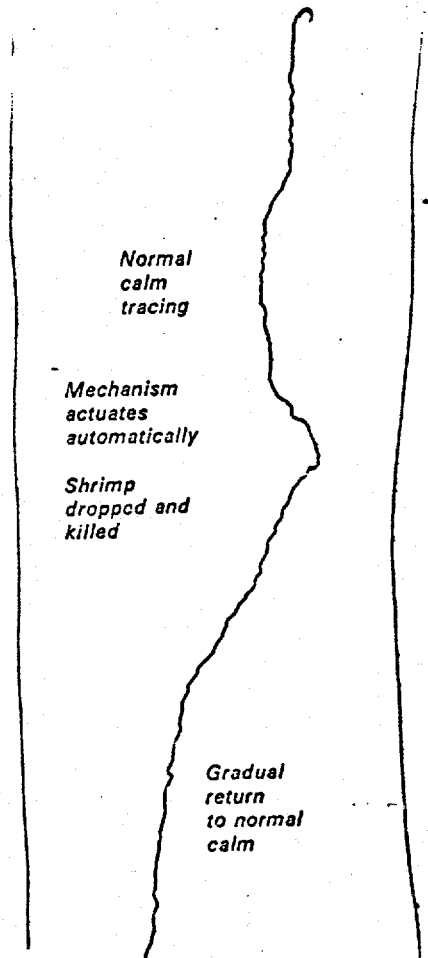
A. Who can say at this point? There are certainly implications here that could have profound effects on those concepts. Our observations show that the signal leaps across distances, as I said before. I have been as far away as New Jersey — about fifteen miles from Manhattan — and have merely thought about returning to my office, only to learn when I returned that at the precise moment I had had the thought — checked against a stop watch — there was a coincidental reaction by the plants to the thought of coming back. Relief? Welcome? We aren't sure, but evidence indicates something like relief. It isn't fear.

Do plants have emotions? The trend of Backster's research results does indeed embrace profound implications. Do plants have emotions? Do they make strange signals of awareness beyond our own abilities to comprehend? It seems so. Personally, I cannot imagine a world so dull, so satiated, that it should reject out of hand arresting new ideas which may be as old as the first amino acid in the chain of life on our earth. Inexplicable has never meant miraculous. Nor does it necessarily mean spiritual. In



Wheatstone bridge circuitry is held in place on philodendron leaf by a special clamp device.

Typical plant reaction to a carefully randomized brine shrimp death, made on the automatic polygraph with no human in the laboratory.



tape from editor Kirkpatrick's interview with Backster and a philodendron.

Bob Henson adjusts contacts

Henson leaves room

First mention of stimulating plant

Backster declines to burn plant

Kirkpatrick and Backster debate methods

Backster refuses to harm plant

Kirkpatrick suggests he burn the plant

Further conversation about stimuli

Reaction to cloud of smoke

Backster called to telephone

Backster's telephone conversation

Backster talking

Backster listening

another extension of our natural laws.

Let me leave you to ponder a question Backster asked me. Many hunters have observed that game animals somehow sense the exact moment of the opening of the hunting season. We can perhaps ascribe this to the noise of the first gunshots. But, how can we explain the similar observation of game's apparent awareness of the exact moment of the season's close? Cleve Backster may be approaching the answer to that question, and a lot of others.

The editors wanted proof... here's what the philodendron gave them!

Editor's note: The editors of NATIONAL WILDLIFE were as doubtful as you may be after reading Thorn Bacon's account of "Backster's Phenomenon", so we visited and photographed him in his offices, just off Times Square in New York City.

We found a quiet, polite, serious and successful student of the psychology of interrogation, working almost full time on the exploration of his discovery in an office cluttered with extremely sophisticated electronic gear and decorated with thumbtacked records of plant — and other cell life — reactions.

He showed us the original tape from his first discovery of the phenomenon, and yard after yard of tapes from succeeding experiments. One thing impressed us immediately: First, Cleve Backster is not some kind of a nut. He really knows his business, and is pursuing his investigations with great care to avoid any chance of criticism from the doubting scientific community, though he admits that seems inevitable.

As we talked, Backster set up his specially modified polygraph with a fairly ordinary philodendron leaf clamped in position for reading the psychogalvanic reflex index. He mentioned that he no longer handles his plants with anything but great care, since they seem to be attached to him as their owner and caretaker. When a plant must be handled or stimulated to produce a reaction, that is done by his assistant, Bob Henson, who "plays the heavy".

As we sat, chatting, the pen traced a graph of normal repose for the plant, until Bob walked in the room. The graph turned suddenly to one of agitation, and bobbed markedly until he left. Then it calmed down again to a normal tracing.

Later, we talked about ways to stimulate the plant for a photograph, and Backster explained that he preferred not to "hurt" the plant. I remarked that perhaps I could do it, and reached for a match, watching in astonishment as the plant produced a violently agitated reaction even as I began to speak.

Still later, the plant's readings became calmer and calmer, and Backster explained that after an extended time, they seemed to become accustomed to stimuli and their reactions became less marked. At that point I blew a cloud of cigarette smoke over the plant without warning, and it produced a jagged little graph that Backster didn't try to interpret but which I proclaimed to be a reaction of annoyance.

While George Harrison was shooting the photograph that appears on pages 4 and 5, Backster suddenly asked him if anything was wrong; the plant was showing something like a sympathetic reaction to consternation, but was not being stimulated in any way. George admitted that he had just discovered that one lens was not working properly, and had been worrying about the photographs he had already made.

Altogether, we ran the machine on that plant for two hours, and produced a dozen very interesting reactions, some of which Backster recognized (though he is very reluctant to try to interpret them in human terms) and some others that made no particular sense at all, like the up-and-down reading yielded from a telephone conversation Backster held in a neighboring office. The plant reacted differently to the periods of Backster's talking and listening for some reason. But it did react.

So the reactions continue, and Cleve Backster's work continues, as he attempts to analyze the nature of the plants' graphs. Some of the possible applications of the phenomenon, in medical diagnosis, criminal investigation and other fields, are so fantastic that he asked me not to repeat them here. His first serious paper on the phenomenon, titled Evidence of a Primary Perception in Plant Life, is scheduled for publication in the International Journal of Parapsychology in January 1969. He awaits the reaction of the scientific community; we await the reaction of NATIONAL WILDLIFE readers. What do you suppose he has discovered?

DICK KIRKPATRICK