

## Soil Study Of Planets Being Conducted

How can we detect and study life in soils from other planets and still remain safe from the danger posed by alien life forms? Pennsylvania State University microbiologists are at work on this problem as the U. S. space program expands the search for extraterrestrial life.

At the request of the National Aeronautics and Space Administration (NASA), Dr. Lester E. Casida, Jr., professor of microbiology, has begun an effort to determine if soil which has been sterilized to kill all life forms, to reduce the risk of contamination, can still yield information about the life it contained.

Can we kill alien life forms, in other words, without destroying the evidence of their existence?

So far, using Earth soil, Dr. Casida and his assistants David L. Balkwill and David P. Labeda, Ph.D. candidates in microbiology, College of Science, have found that one form of heat sterilization cannot be used. Dr. Casida says, "the cells are not only killed, but are totally

destroyed by the process." However, the Penn State team has found that another heat method leaves many of the dead cells at least partially intact and, Dr. Casida adds, "very preliminary work on chemical sterilization looks like it might work as well."

Dr. Casida has been studying terrestrial soil bacteria for over 15 years and has discovered

several new types of bacteria which are extremely difficult to isolate for study in the laboratory. He and his students have also developed two techniques (thin-sectioned and frozen fractured preparations) which make it possible to use the electron microscope to study bacteria as they occur naturally in the soil. Using these non-destructive techniques, they have

discovered that bacterial cysts and dwarf bacteria, too small to be seen with conventional light microscopes, frequently inhabit soil.

Dr. Casida explains that the other usual techniques for studying soil bacteria require trying to make them grow in the laboratory on special media or food. He says, "these growth methods are frequently unsuccessful since 99 per cent of the bacteria in soil have extreme difficulty in adapting to growth under laboratory conditions."

With this fact in mind, Dr. Casida warns that the first efforts to detect life on Mars during the unmanned Viking mission in 1976 may prove disappointing. He explains that the life-detecting device that will be soft-landed on Mars will not bring any samples back to earth for study. The automated device will scoop-up and test soil for signs of life, relying completely on growth techniques or metabolic responses, and then relay the information back to earth. Dr. Casida notes: "Since we can't grow most of the organisms in

Earth soil it should be doubly difficult to grow Mars bacteria by remote control."

He emphasizes that negative results from Viking will not indicate a lifeless Mars but, rather, increase importance of the development of non-growth detection techniques such as the use of electron microscopy.

If Dr. Casida's current NASA-funded study is successful, a soil specimen gathered from another planet may one day be sterilized in transit to kill living material before it gets to Earth. Then, with the threat of damage to life on Earth diminished, the dead bacteria can be detected and studied using Dr. Casida's techniques.


## Support for AEB Program Grows

"California Egg Producer, Jack Hayre, recently presented American Egg Board with a check for \$5,000 as a token of his support for the national advertising and educational effort currently being undertaken by AEB. This gift was gratefully acknowledged with a Resolution of Appreciation passed by the AEB Executive Committee at its recent meeting," so stated Edward D. Murphy, Chairman of AEB's Board of Directors.

"This unsolicited and voluntary investment in our national

promotional program is most welcome, and I hope indicative of the growing support on the part of the egg industry for a strong national program," continued Chairman Murphy.

While additional funds have been provided to AEB via carton manufacturers and poultry breeders, the support of the producers, packers, and distributors of eggs is also vital to the growth of these new programs being proposed by the American Egg Board.



Clay tablets dating from about 2000 B.C. show that in Babylonia valuables were deposited for a service charge of 1/16th of what they were worth. Interests on loans ran as high as 33-1/3 percent!

# WENGER'S LARGE SELECTION OF FARM TRACTORS

stock number	make & model	gas or diesel	power steering	wide front	3 point	attachments	comments	price
22828	Farmall A	G		X				675
21626	Case 1170	D	X	X	X		700 hrs.	9500
21517	M.F. 165	D	X	X	X			3000
21610	Oliver 1855	D	X	X	X		1700 hrs.	7250
21553	Oliver 1750	D	X	X	X	Weights-cab	2100 hrs.	5950
21602	Farmall M	G						950
21425	Case 1030 CK	D	X	X	X	weights		5250
21588	J.D. 4010	D	X	X	X	turbo-charger		3930
21074	J.D. 5020	D	X	X	X	weights	1700 hrs.	8500
21298	J.D. 3010	G	X	X	X		2500 hrs.	2796
22085	A.C. D17	D	X	X	X	weights	series IV	3135
21574	Oliver 1950 GM	D	X	X	X	weights-cab	2000 hrs.	6350
21578	Farmall 340	G	X		FH	weights	1500 hrs.	1575
21591	Farmall 450	G	X	X	X			1750
21663	J.D. 4020	D	X	X	X		2000 hrs.	7500
21609	Oliver 1855	D	X	X	X		1400 hrs.	7250
21185	Farmall 450	D	X		FH	weights		2150
21061	Int 4100	D	X	X	X	weights-cab 4 wheel dr.	1800 hrs.	11600
21627	Oliver 1950T	D	X	X	X	fender tanks		5750
22177	A.C. 180	G	X	X	X	weights	1400 hrs.	5225
20429	M.F. 175	D	X	X	X		2500 hrs.	3500
22829	J.D. 2020	D	X	X	X	1300 hrs		3850
19457	M.H. 44	G				318 Chrysler	new tires	1650
21741	J.D. 2510	D	X		X		100 hrs.	3355
21730	Ford 3000	G		X	X	Dearborn snow plow	1600 hrs.	3250
22345	J.D.B.	G				Cultivator		495
22568	Farmall S M	G				Int. 1701 Ldr.	weights	1075
21589	Int. 656 Utility	G	X	X	X	weights	2400 hrs.	3800
21352	A.C. D19	D	X	X	X			2910
22380	Farmall H	G				like new tires	975	850
20655	A.C. D15	G	X	X	X		excellent rubber	2235
21359	Case 930 CK	D	X	X	X			2950
21467	J.D. 4020	D	X	X	X	turbo charger	completely overhauled	6750
22706	A.C. D17	G	X	X	X	good condition		1950
22714	Int. 444	G	X	X	X	300 hrs.	Ldr.	4250
22743	J.D. 720	D	X		X			2450
22755	A.C. 160	D	X	X	X	500 hrs.		4250
22773	Oliver 1800	D	X	X	X			3950
22767	Farmall 1206	D	X	X	X	Roll Bar		7900
22783	Int 650	D	X	X		Standard		1950
22785	Farmall Cub	G		X		Hydraulic		875
22788	Farmall 100	G		X		Hydraulic		1595

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