

REPORT DOCUMENTATION PAGE

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1b RESTRICTIVE MARKINGS

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3 DISTRIBUTION / AVAILABILITY OF REPORT
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ACCESSION NO

11 TITLE (Include Security Classification)

Neuronal Mechanisms of Intelligence

12 PERSONAL AUTHOR(S)

Larry Stein

13a. TYPE OF REPORT

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13b TIME COVERED

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16 SUPPLEMENTARY NOTATION

17 COSATI CODES

FIELD

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SUB-GROUP

18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

operant conditioning; positive reinforcement; reward;
learning; adaptive networks; self-stimulation

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

Data collection and analysis equipment were purchased to support research on operant conditioning in single neurons and behaving rodents. The equipment was installed and is fully operational.

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SELECTED
MAY 20 1988
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20. DISTRIBUTION / AVAILABILITY OF ABSTRACT

☒ UNCLASSIFIED / UNLIMITED☒ SAME AS RPT☐ DTIC USERS

21 ABSTRACT SECURITY CLASSIFICATION

UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL

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22c OFFICE SYMBOL

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87-0019

Final Scientific Report for AFOSR Grant No. 84-0325

November 1987

1. Equipment Acquired.

The following list describes all equipment actually acquired by name, manufacturer and cost. The purchased equipment was identical to that requested in our final revised equipment listed dated May 22, 1987. An alternative system with greater capability and similar price was substituted for the requested Tektronix System because the vendor was unable to provide the necessary software.

<u>Item Purchased</u>	<u>Manufacturer</u>	<u>Cost</u>
7 PS/2 Computer Systems	IBM	13,517
1 8-Stimulation Interface	Coulbourn	27,460
10 Model E17-72 Stimulation Isolators	Coulbourn	15,129
5 Oscilloscopes	Tektronics	6,501
	Total Expense	62,607
	Cost Sharing	(12,521)

Grant Expenditure \$50,086**2. Equipment Usage.**

➤ All equipment has been used for on-line experimental control, data collection, and data analysis functions. In this work, we are investigating the adaptive rules used by mammalian brain cells in the mediation of intelligent behavior. The research is based on the assumption that human intelligence has evolved from the goal-seeking brain functions of lower forms, and that these functions in turn depend on a capacity for behavior to be strengthened or rewarded by its consequences (positive reinforcement). We furthermore assume that positive reinforcement of the intact organism is physiologically mediated at the level of the single neuron, rather than at the level of the multi-neuronal assembly or network. The equipment is being used in the performance of experiments designed to investigate whether individual cellular activity can be reinforced by locally applied electrical or chemical stimulation, and, if so, to establish the physiological and biochemical properties of such cellular reinforcements. Experiments are being conducted on single neurons in cell culture, brain tissue slices, and intact brain. The instrumentation enabled us to investigate modification of ionic channels and cellular biochemistry related to reinforcement. In addition, the equipment was used for detailed data analysis and computer modeling. (C)

3. Personnel.

Following is a list of all personnel who have used the equipment:

Larry Stein, Ph.D.	PI
James Belluzzi, Ph.D.	Co-PI
Alan Fairhurst, Ph.D.	Professor
Frances Leslie, Ph.D.	Associate Professor
Charles Gorenstein, Ph.D.	Assistant Professor
Andrej Rotter, Ph.D.	Assistant Professor
Joel Black	Graduate Student
Karen Stevens	Graduate Student
David Self	Graduate Student
Diana Hurlbut	Graduate Student
Giochi Shiotsu	Student
Jennifer Wang	Student

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