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DATE: 1970

TITLE: Some research results concerning the effects of AC electric fields and pulses
on the giant amoeba, Chaos choas.

SOURCE: Report, The Moore School of Electrical Engineering, U of PA, 8pp

MAIN SUBJECT HEADING:

AN	HU	AT	IH	M
ANALYTICS	HUMAN EFFECTS	ANIMAL TOXICITY	WORKPLACE PRACTICES- ENGINEERING CONTROLS	MISCELLANEOUS

SECONDARY SUBJECT HEADINGS: AN HU AT IH M

Physical/Chemical Properties

Review

Animal Toxicology

Non-occupational Human
Exposure

Occupational Exposure

Epidemiology

Standards

Manufacturing

Uses

Reactions

Sampling/Analytical Methods

Reported Ambient Levels

Measured Methods

Work Practices

Engineering Controls

Biological Monitoring

Methods of Analysis

Treatment

Transportation/Handling/
Storage/Labeling*Not
Relevant*

MIR 7/19

THE MOORE SCHOOL OF ELECTRICAL ENGINEERING

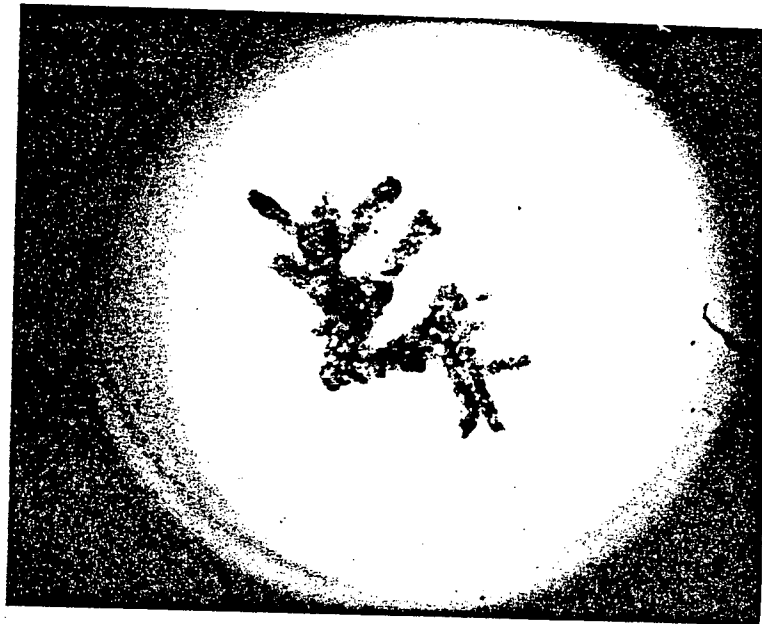
UNIVERSITY OF PENNSYLVANIA
PHILADELPHIA, PENNSYLVANIA

SOME RESEARCH RESULTS
CONCERNING THE EFFECTS OF AC ELECTRIC FIELDS
AND PULSES ON THE GIANT AMOEBAS, CHAOS CHAOS

BY

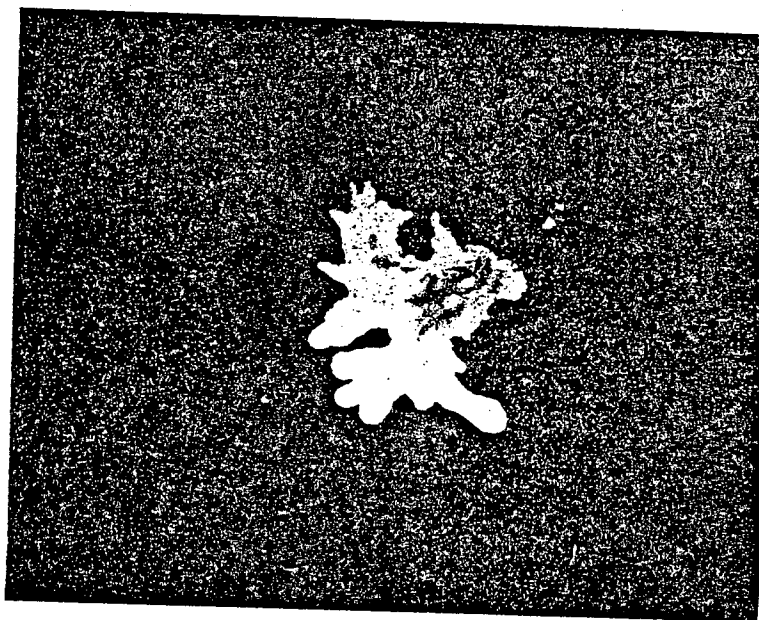
ALBERT W. FRIEND, JR.

SPRING 1970



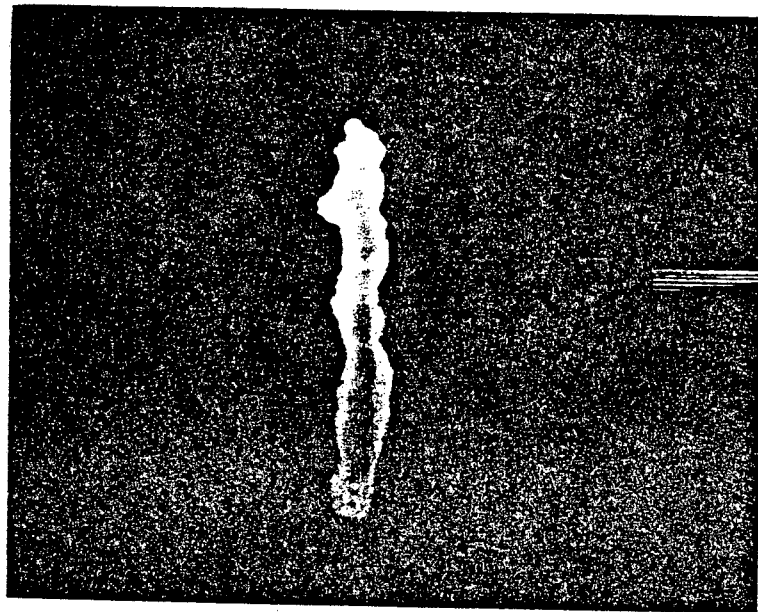
Normal Chaos chaos, Bright Field.

FIGURE 1.



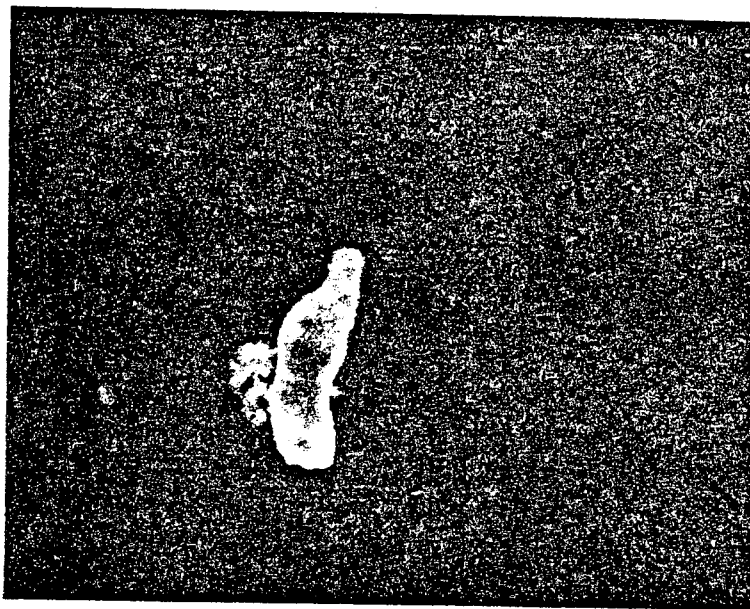
Normal Chaos chaos, Dark Field.

FIRGURE 2.



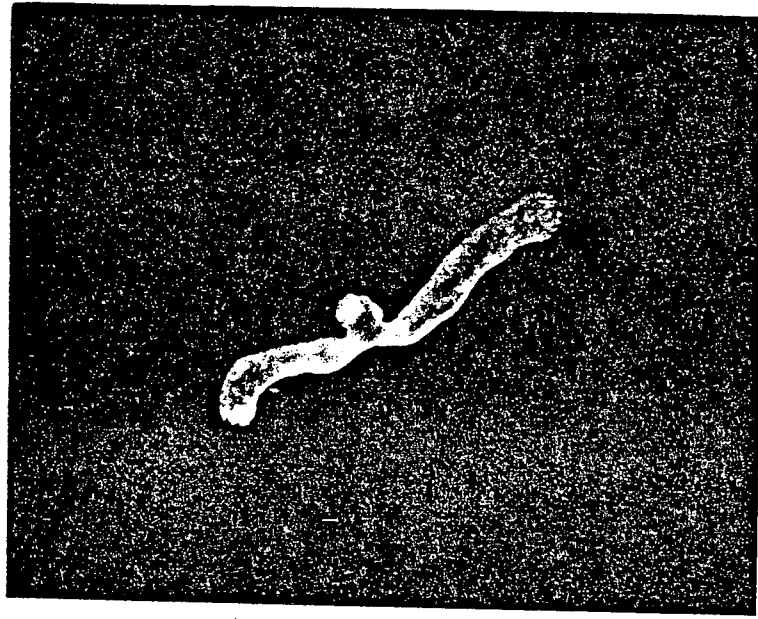
Chaos chaos Elongated Perpendicular to an AC Electric field (12 volts/cm later reduced to 10 volts/cm and 200 Hz.)

FIGURE 3.



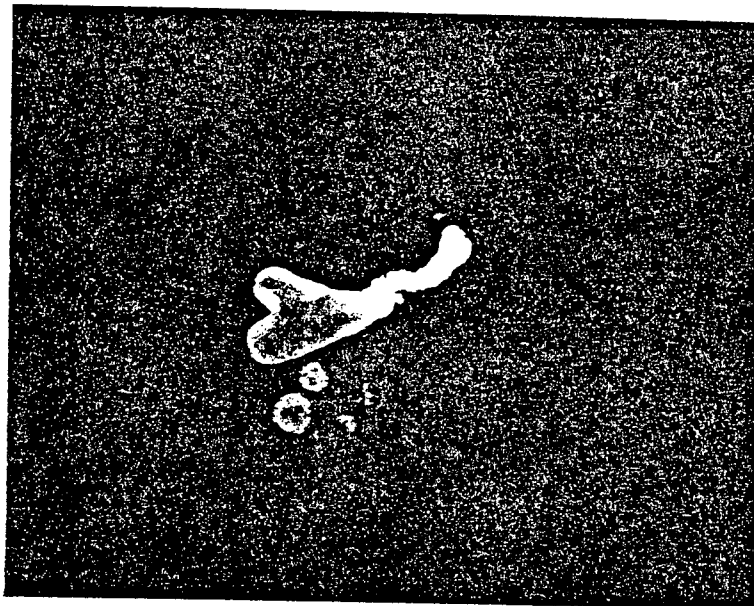
Elongated Chaos chaos Breaking Down At Side After Exposure To Electric Field (12 volts/cm and 200 Hz) For Several Minutes.

FIGURE 4.



Chaos chaos In Fig. 3 Approximately
10 Minutes After Removal Of Field,
Amoeba Has Resumed Crawling.

FIGURE 5.



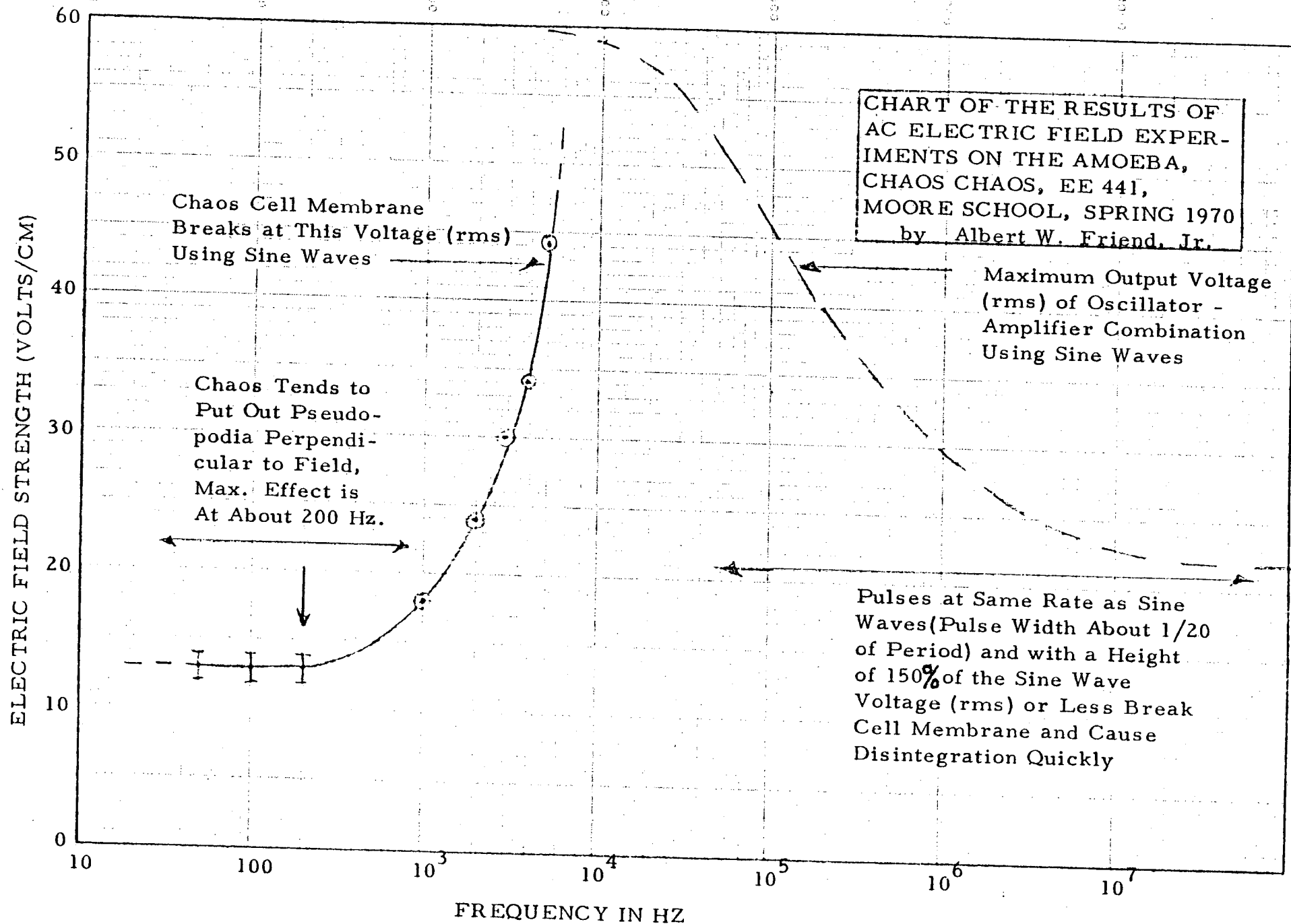
Chaos chaos Separated Into Several
Pieces By Transient Of Short Duration
And Mild Intensity (Amoeba And Pieces
Have Had Several Minutes To Recover),
Stronger Transients Disintegrate Amoeba
Permanently.

FIGURE 6.



Chaos chaos Elongated Perpendicular to a 12 volt/cm AC Electric Field at 100 Hz. (The Amoeba has put out a small pseudopod at one end parallel to the field. This is an indication that 100 Hz is less effective than 200 Hz.)

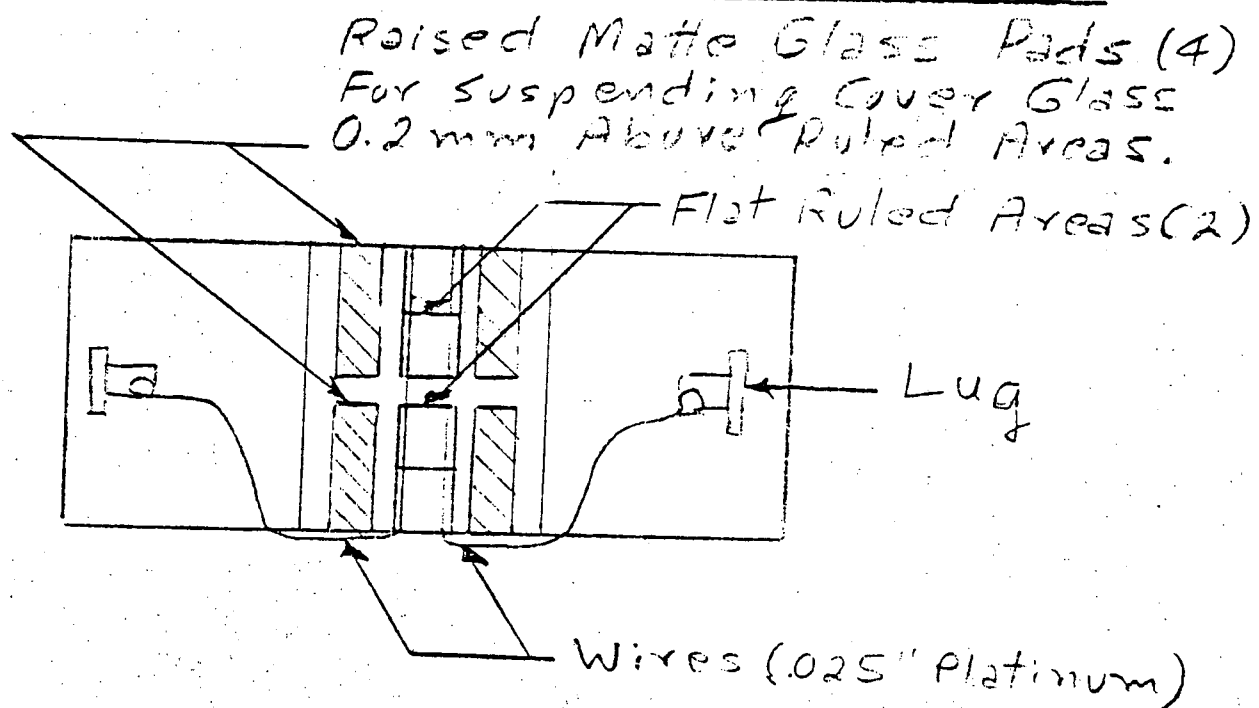
FIGURE 7.



FREQUENCY IN HZ

FIGURE 1

Top View of Chamber with Electrodes



Note: Only one flat ruled area was wetted with culture fluid.

Cross Section of Working Area

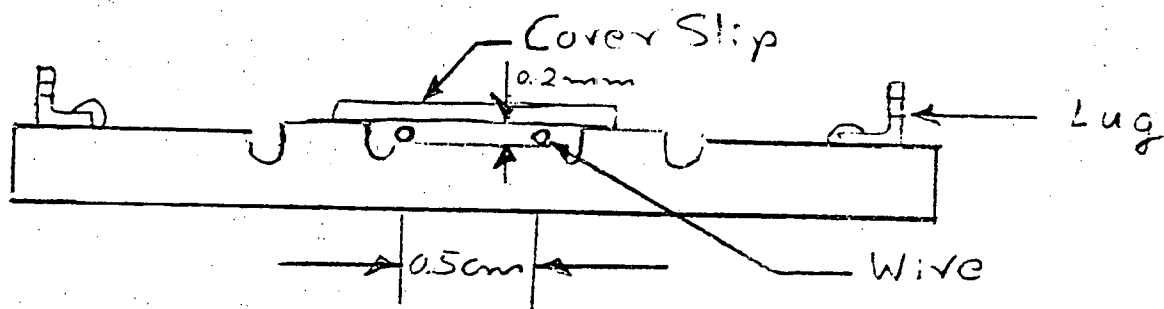


Figure 2

TABLE I

Capacitance of empty chamber = 1.0 pF

Capacitance of chamber filled with amoeba culture fluid could not be measured directly due to broad null, but was calculated from conductance and Q.

f	Q	G _p	C
Hz	—	μ Ω	pF
100	(1.12)?	15.14	(269.9 nF)?
500	0.1	15.88	539.8
1000	0.03	16.02	76.48
2000	0.014	16.00	17.83
5000	0.004	16.30	2.075
10,000	0.002	16.42	0.5220
20,000	0.0015	16.51	0.1973

Capacitance at high frequencies was measured using an RF bridge. The leads were simply attached to binding posts on the bridge so that coupling effects were undoubtedly introduced.

f	C	R _p
MHz	pF	K
0.5	7.99	4.0
1.0	5.53	3.7
2.0	1.7	3.9

Comment:

I don't believe that any of these measurements were particularly accurate, but at least they do indicate that the capacitance is probably quite low.