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QUARTERLY REPORT: 15G-C2430-1

CONTRACT: NASW 1841

PERIOD: November, 1968 - February, 1969

1. ELECTRODE DESIGN

The first task was to develop measurement electrodes suitable for long-term implantation and measurement of the evoked response. The stimulating electrodes developed are of the coaxial, concentric bipolar type (Fig. 1). The outside pole is a stainless steel tube 0.8 mm thick and the internal pole a .45 mm wire. This wire was factory insulated and protrudes beyond the stainless steel cannula by approximately 0.5 mms. The entire electrode is completely insulated with "Epoxy" (a resin from Ciba lab) and cured in the oven at 100°C for four hours.

Following this procedure, the tips of both poles are cleared from resin to an extent of approximately 0.3 - 0.5 mms. The distance between both tips (non-insulated portions) is approximately 0.2 mm.

The impedance of this electrode, measured in Ringer's solution is between 1 and 3 megohms.

Insulated copper wire with an exposed tip of .5 mm is satisfactory for use as recording electrodes.

Both types of electrodes were implanted and typical evoked response data were obtained following a 5-day stabilization period. The electrodes were implanted in the Hippocampus and cerebral cortex, and potentials were recorded in response to stimulation of the Fornix-

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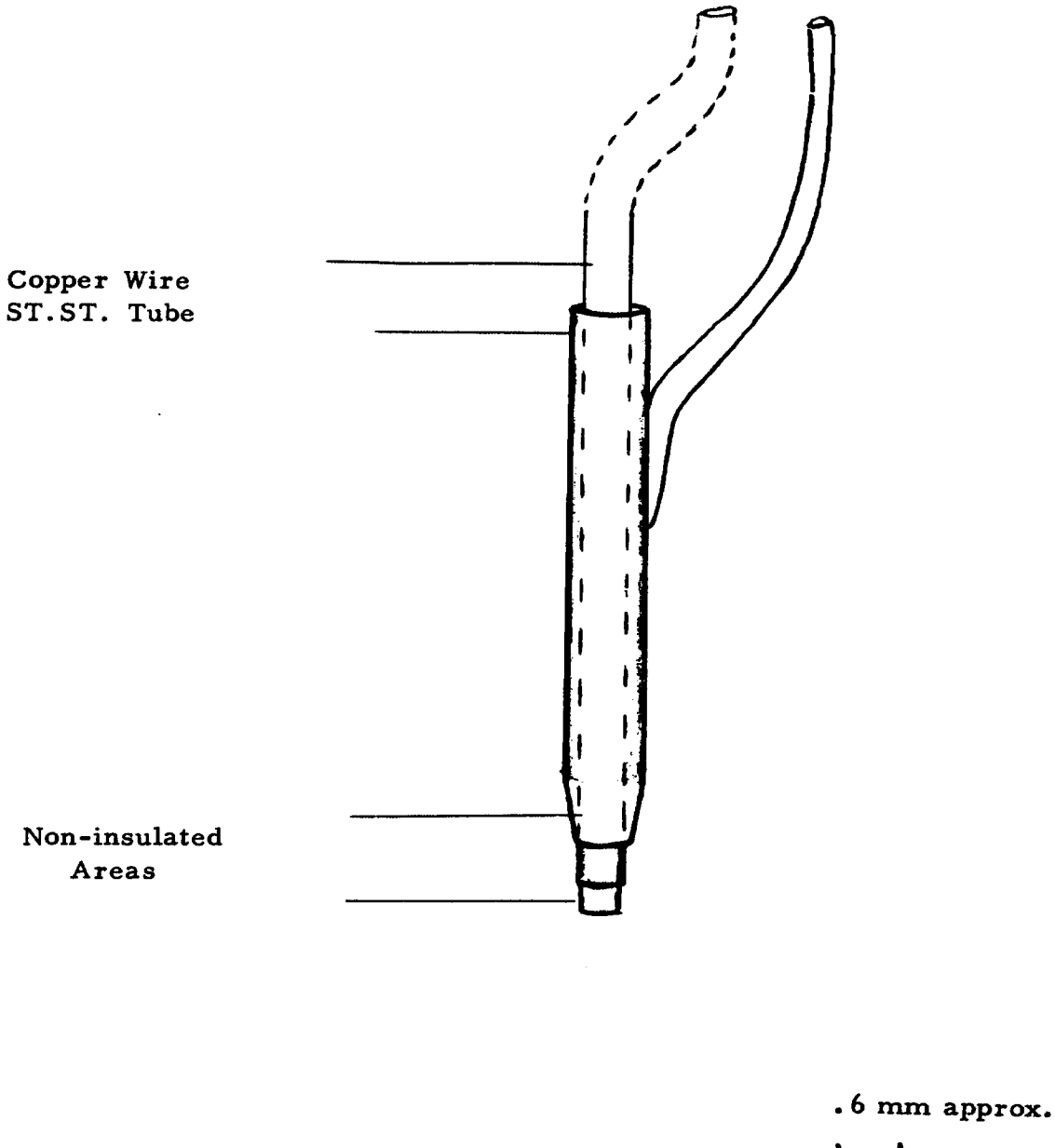


Fig. 1. Stimulating Electrode

Septum area. Pulse durations and amplitudes were varied and adjusted for optimum response. Based upon these preliminary tests, a 7.2 volt pulse of 0.6 msec. evokes a relatively clear response. Additional testing will confirm these results and establish optimum stimulus parameters for depth recording.

2. EXPERIMENTAL DESIGN

The original plan was to develop procedures for acquisition and analysis of cortically evoked potentials from deep brain structures in response to bipolar electrical stimulation. Following the establishment of optimum stimulus conditions, the responses were to be analyzed for quantitization of suitable parameters which characterize the evoked response.

After reevaluation of the problem, we have decided to expand our methodological procedures to include both a passive and active measurement.

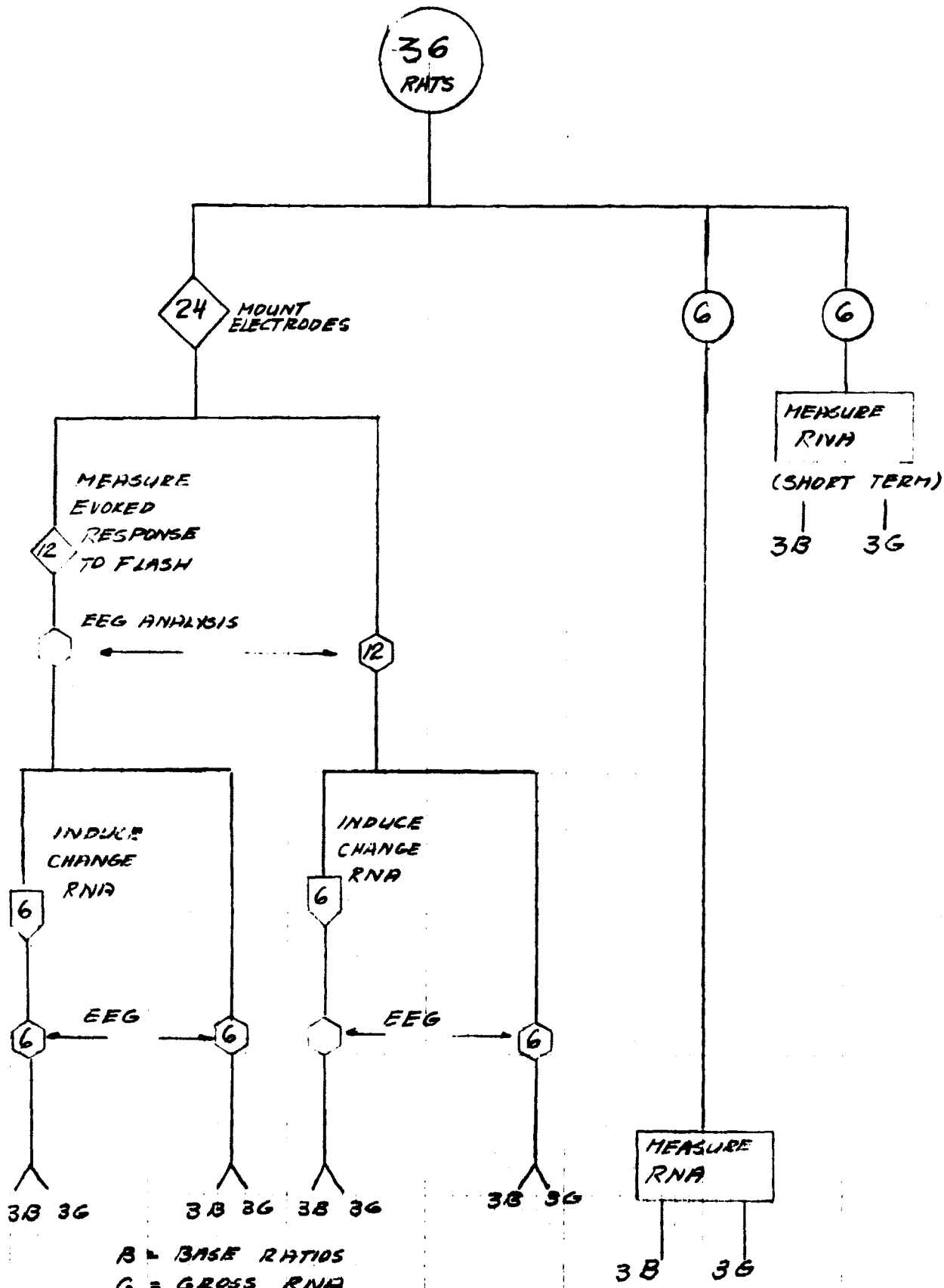
The passive measurement will involve analysis of surface EEG potentials under non-stimulus conditions.

The active measurement will involve analysis of evoked potentials in response to photic stimulation. It is felt that the elimination of depth electrode measures will both simplify the experiment and permit us to apply the developed techniques to correlative studies in human subjects.

The revised protocol (Fig. 2) is designed to evaluate the following experimental stimuli and effective dorrelations:

1. Electrode mounting

- REVISED PROTOCOL - FIG. 2



2. Time course of RNA in absence of other stimuli

3. Change in RNA due to photic stimulation

4. EEG correlates to gross RNA and base ratio division

5. ER correlates to gross RNA and base ratio division

3. PLANS OF NEXT QUARTER

1. Implement the revised protocol

2. Continue evaluating methods of analysis

3. Design instrumentation and select storage media for planned centrifugation Phase II

A. Marmarou

Head, Biosystems Analysis Section

Approved:

R. M. Goodman, Manager
Biodynamics Laboratory