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Attachment to ORD 2240-75

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Approved For Release 2000/08/10: CIA-RDP96-00787R000200150006-0 988 passes). The results, shown in Table 3, indicate no significant

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departure from random expectation during the successful run, and therefore, the significant result cannot be attributed to machine malfunction.

At a later time, subject S2 was asked to repeat the entire experiment, and he was able to replicate successfully a high mean scoring rate (27.88/100 average over 2500 trials, a result whose a priori probability under the null hypothesis is $p = 4.8 \times 10^{-4}$).

We thus conclude from this part of the study that of the six subjects tested, one subject (S2) generated a significant result replicable and not attributable to machine malfunction.

Finally, the study taken as a whole (15,750 trials) was significant, yielding an average scoring rate 26.47 hits/100 trials, a result whose a priori probability under the null hypothesis is $p = 1.1 \times 10^{-5}$.

The bit rate associated with the information channel can be calculated from

$$R = H(x) - H_{y}(x)$$

where H(x) is the uncertainty of the source message containing symbols

with a priori probability P_i

$$H(x) = \sum_{i=1}^{4} P_i \log_2 P_i$$

and H (x) is the conditional entropy based on the <u>a posteriori</u> proy babilities that a received symbol was actually transmitted

$$H_{y}(x) = - \sum_{i,j=1}^{4} P(i,j) \log_{2} P_{i}(j).$$

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Approved For Release 2000/08/10: CIA-RDP96-00787R000200150006-0 For S2's first run, with P = 1/4, P(k,k) = 0.2936, and an average of

30 seconds per choice, we have a source uncertainty H(x) = 2 bits and a

calculated bit rate

 $R \approx 0.007 \ \text{bits/symbol}$

 \mathbf{or}

 $R/T \approx 2x10^{-4}$ bits/sec.