very poor optical properties when dried and hence could be used only around the edges.

With the arrangement described and because the light flashes from high energy protons in anthracene are quite large, it was possible to operate the phototubes at such a level that no appreciable thermal noise was counted. With the amplifiers set at twice the gain normally used, four single channel counts per minute were recorded with the cyclotron running but with no anthracene crystal in place.

C. Amplifying and Counting Systems

The pulses from the photomultiplier tubes went directly to cathode followers, each of which fed 250 feet of RG 62/U cable terminated in its characteristic impedance of 95 ohms. The lengths of the two lines were compared by observing reflections of fast pulses on the scope. The difference was found to be less than 0.01 μ second. This figure was certainly satisfactory since a coincidence resolving time of 0.2 μ second was used. The pulses were next amplified by means of commercial versions of the Jordan-Bell linear amplifier[8] and were fed from discriminators in the coincidence circuit,[9] and then into a scaler. The scalers and amplifiers were built by the Atomic Instrument Co., Cambridge, Mass.

Amplifiers used with a pulsed beam such as is present in an f-m cyclotron, sharply limit the possible counting rates unless the dead time is a small fraction of the burst time. The individual bursts on the

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[8] W. H. Jordan and P. R. Bell, Rev. Sci. Inst. 18, 703 (1947).

[9] Howland, Schroeder, and Shipman, Jr., Rev. Sci. Inst. 18, 551 (1947).