

CONFIDENTIAL

15 September 1964

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Trip Report

Place:

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Date: 17 August 1964

ATTENDEES:

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SUBJECT: Diapole Materials and VADO

1. Discussion started with [redacted] giving a brief dissertation on the past record and history of the company. [redacted] is more of a patent factory than a manufacturing or R&D firm.

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2. [redacted] presented a short explanation of diapole theory. Basically, diapole antenna theory, which is normally applied to radar or television, can also be applied to the shorter wave lengths of visible light. Light is an electromagnetic phenomena and reacts much the same as microwaves if the antennae are scaled down to the size of a half-wave length of visible light; that is, minute antennae, in the form of myriads of ultra-small diapole particles suspended in a medium, react with light in the same manner that a large scale diapole antenna responds to a T.V. signal. Minute diapole antenna can be designed to receive, reflect, modulate or attenuate the shorter wave lengths of light by changing their orientation, the ratio of their length to width and/or their electrical resistance.

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3. Light can be controlled in intensity, color and polarization by these dipoles dispersed in a plastic solution to form a colloidal suspension. Orientation of the dipoles is controlled by applying a magnetic field in such a manner that the dipoles align themselves with the magnetic lines of force. Proper control of the magnetic field can make the colloids transparent, opaque or polarized, etc., dependent upon the diapole orientation.

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4. There are many potential uses of this technology, e.g., camera shutters, continuously variable density filters, spatial filtering, image intensifiers and image modulators, etc.

5. The primary interest in Diapole technology is for its potential use as a sophisticated light valve. Combining a Diapole device with a photoconductor could produce an advanced high intensity rear-projection viewer. The image is projected in normal manner upon the photo conductor by a U.V. or I.R. source. The photoconductor produces a varying current and associated varying magnetic field which, in turn, controls the alignment of the dipoles resulting in a diapole mask replica of the original image. This mask then modulates the back lighting beam from a high intensity source to form the image on the screen. The advantage is that only a low intensity I.R. or U-V light passes through the film thereby reducing the film heating problem since the high intensity light never passes through the film. The unit acts as a light amplification circuit in much the same manner that a vacuum tube or semi-conductor functions in a radio circuit.

6. The VADO materials might produce a new photographic recording medium in the form of a molecular, threshold device which only becomes photo sensitive when an electric potential is applied to the film raising its energy level.

7. VADO materials were originally developed to be used for pilots goggles for atomic flash protection. Sudden exposure to intense light turns the material opaque. Once the light flash passes, the film reclears again to normal transparency.

8. [] demonstrated VADO and Diapole materials. They have made tremendous progress in the last three months. These materials are far superior to the materials we saw demonstrated in June.

9. The Development Branch should give serious consideration to following and supporting some breadboard type research utilizing the Diapole and VADO technology.

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Development Branch, F&DS

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