first sediment, than in those given second sediment or homogenized tissue may have one of several interpretations. It is possible that less of the active material is actually sedimented, because of ready solubility. On the other hand, it is equally possible that the large amount of inert material associated with active material exerts either directly or indirectly an inactivating effect.

The observations reported appear to show: (1) That the active carcinogenic agent or agents in the lactating breast from high cancer mice are present in a fraction obtained by ultracentrifugation of homogenized tissue, which fraction is virtually free of matter above colloidal dimensions, and contains a large share of the soluble material of high molecular weight. (2) That the active material in the above-mentioned fraction is either greatly concentrated by the procedures employed or that interfering substances are removed. (3) That the agent or agents in question appear in traces if at all in the fat fraction and in the final supernatant fluid. The exact nature of the active agent is not certain from these studies, but it becomes very probable that the agent is a colloid of high molecular weight and may be a virus. Further studies on a larger series of animals are in progress.

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## Transfusion of Bovine Serum Albumin into Human Beings.

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In a previous communication[1] it was reported that the intravenous administration of bovine serum albumin was effective in raising and maintaining the blood pressure of dogs subjected to severe hemorrhage. The present report is concerned with the effects of transfusion of bovine serum albumin into human beings.

*Materials and Methods.* The serum was obtained from bovine blood and centrifuged. The supernatant serum was removed, pooled and passed through a Seitz filter. The pooled serum was treated with an equal volume of a saturated solution of ammonium sulfate (54%). This mixture was now filtered through a Buchner filter which removed the precipitated globulin. The filtrate was fully sat-

[1] Davis, H. A., and Eaton, A. G., PROC. SOC. EXP. BIOL. AND MED., in press.

urated with ammonium sulfate and refiltered through a Buchner filter. The precipitated albumin was then placed in cellophane cylinders and dialyzed against distilled water to remove completely the ammonium sulfate. In the present series of experiments the albumin content of the serum from analysis was 5 g %. The serum albumin was passed through a Seitz filter and finally through a Berkefeld filter. Tests for sterility were run on each pooled lot of bovine serum albumin, using as media, infusion broth, brain broth, plain agar and blood agar plates. The intraperitoneal injection of the serum albumin into white mice in relatively large amounts (1 cc per 15 g of body weight) revealed a complete absence of toxic effects.

The human subjects varied in age from 15 to 65 years. Intradermal injections of the serum albumin (1 cc) were made in each subject to determine the presence of sensitiveness to the serum. Blood pressure readings were made before, during and after the injections. The serum albumin was administered by vein in amounts of 50 cc to 300 cc at a rate of 5 cc per minute. Preliminary cross-matching of the serum albumin with the blood of the prospective recipient was not carried out.

*Results.* The effects of the transfusion of bovine serum albumin in 13 human subjects are illustrated in Table I. The blood pressure remained unchanged or rose slightly during the transfusion. No evidences of a foreign protein reaction such as dyspnoea, urticaria or fall in blood pressure were observed. In none of the patients was albuminuria noted. Rigors and elevations of the temperature did not occur. Out of 16 patients who were given

TABLE I.
Effects of Transfusion of Bovine Serum Albumin in Human Beings.
Intradermal test 1 cc, all negative; urinalysis, no albuminuria; result, negative.

| Patient | Age, yrs | Amt bovine serum albumin, cc | Blood pressure | | |
|---|---|---|---|---|---|
| | | | Before inj., mm Hg | During inj., mm Hg | After inj., mm Hg |
| R.R. | 23 | 50 | 134/93 | 130/98 | 131/94 |
| C.J. | 15 | 50 | 130/68 | 138/78 | 130/60 |
| H.D. | 43 | 50 | 118/95 | 136/84 | 128/80 |
| C.J. | 57 | 50 | 158/100 | 158/100 | 158/100 |
| W.H. | 63 | 50 | 138/74 | 150/78 | 142/74 |
| E.M. | 55 | 100 | 100/68 | 98/60 | 104/74 |
| H.S. | 39 | 100 | 140/110 | 144/106 | 140/110 |
| C.S. | 57 | 100 | 106/88 | 114/74 | 106/74 |
| L.W. | 37 | 100 | 142/88 | 144/88 | 144/88 |
| H.P. | 31 | 200 | 106/56 | 110/62 | 106/58 |
| E.G. | 26 | 200 | 124/70 | 128/80 | 132/74 |
| E.J. | 65 | 200 | 98/58 | 98/56 | 106/60 |
| R.S. | 27 | 300 | 114/80 | 120/86 | 114/64 |

the intradermal test injections (1 cc) only 2 showed a doubtful positive local reaction (Grade 1).

*Comment.* The absence of toxic effects following the transfusion of bovine serum albumin into human beings and into mice tends to substantiate our previous statement[1] that it is the globulins of bovine serum which are responsible for the toxicity of the whole serum. The results of the transfusion of bovine serum in human beings are promising from the viewpoint of its use as a substitute for blood. The absence of albuminuria following these transfusions possibly indicates that bovine serum albumin is utilized by the human being.

*Summary.* The intravenous administration of bovine serum albumin to 13 human beings has given encouraging results, inasmuch as no reactions were noted. The blood pressure was maintained at, or rose above, the initial level. Vasodepression was not observed. The significance of these results in relation to the use of bovine serum albumin as a blood substitute in human beings is discussed.

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## A Study of the Effect of Desoxycorticosterone Acetate on Capillary Permeability.*

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The adrenal cortical hormones may increase the circulating plasma volume in adrenal insufficiency (1) by the control of renal function and (2) by the transfer of water and electrolytes to the blood stream from the tissues.[1] Whether these mechanisms operate by an alteration of capillary permeability is not known. The purpose of this communication is to report data bearing on this point.

The diffusion of dyes from the blood stream was utilized as a means of observing the capacity of desoxycorticosterone to influence the flow of fluids across the capillary membrane. Normal white rabbits were given one intravenous dose of one of 3 different dyes: trypan blue, brom phenol blue or patent blue V.† For each rabbit

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1 Kendall, E. C., *Proc. Staff Meetings, Mayo Clinic*, 1940, **15**, 297.