The resulting electron-density of about 600 per cm.$^{-3}$ near the earth's orbit gives a gas-density of about $10^{-21}$ gm.cm.$^{-3}$, since for electrostatic equilibrium one proton or other positive ion is necessary for each electron. The density of the dust—$10^{-15}$ particles cm.$^{-3}$—comes out to about $10^{-23}$ gm.cm.$^{-3}$ near the earth, or only a hundredth of the density of the gas. The decrease of density of dust towards the sun as shown in the diagram may be the result of evaporation of dust particles near the sun, as is similarly found in the nuclei of comets.

The brightness of the light-bridge connecting the morning and the evening zodiacal light is correctly represented by the above dust density (the contribution of the electrons to the light-bridge is small since their number decreases rapidly outwards). The luminosity near the counterpoint of the sun, the so-called counterglow (*Gegenschein*) with a diameter of about 20°, is 30 per cent higher than in the light-bridge. If the counterglow is explained as the result of a cloud of dust-particles near the outer libration-point in the system sun–earth[4], this cloud is situated at a distance of 0·01 astronomical units from the earth and has a density about thirty times higher than the mean density of dust near the earth's orbit.

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## Action of Cortisone on the Polymerization of Actin

In adrenalectomized animals maintained on an adequate diet, the work capacity of skeletal muscle, as shown by the response to prolonged repetitive stimulation, is greatly diminished[1]. This effect is apparently not due to a direct failure of energy supply as could be expected from hypoglycæmia, but to an alteration in the metabolic or contractile system of the cell.

It has been shown by Horvath *et al.*[2] that the cardiac glycosides enhance the polymerization of actin prepared from cardiac muscle but do not affect actin from skeletal muscle. These observations have been confirmed in this laboratory, and the possibility that cortisone might act in a similar manner on skeletal muscle actin alone has been investigated.

Actin was prepared from skeletal muscle of the dog by the method of Straub *et al.*[3]. Solutions obtained by the extraction of 1 gm. of dry powdered muscle residue with 20 ml. of carbon dioxide-free distilled water had an actin content of 5–6 mgm./ml. Polymerization was followed by viscometry measurements at 10° C. using the Ostwald viscometer.

Our results show that cortisone in a concentration of 25 μgm./ml. added as a solution in propylene glycol increased the rate of polymerization twofold compared with a control preparation containing the solvent alone and of identical ionic constitution. This effect is apparent throughout the range of concentration of cortisone 0·25–50 μgm./ml. The polymerization was carried out at the physiological ratio of potassium to calcium (potassium, 0·054 *M*; calcium, 0·001 *M*) with a trace of magnesium (0·0005 *M*) and in the presence of veronal-acetate buffer of *p*H 7·4. All salts were present as chlorides.

Under identical conditions, actin prepared from the cardiac muscle of the dog showed no alteration in polymerization-rate when cortisone was present in a concentration of 25 μgm./ml.

The globular to fibrous transformation of actin effected by ions *in vitro* is an extreme case of small changes occurring in the actin particles in the intact cell and gives a good indication of these reactions. It would seem that steroid substances have a role in the regulation of contractile force through an influence on actin particles.

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## Serum as a Source of Growth-factors for *Trichomonas fœtus*

Cailleau[1] concluded that cholesterol, ascorbic acid and a third unidentified factor were essential for growth of *Trichomonas fœtus*. Ascorbic acid, however, may only have been required because of its reducing properties[2]. The object of the present study was to investigate the nature of the factors in serum required by *T. fœtus* when grown in bacteria-free culture.

Stock cultures of the organisms were grown in 2 per cent glucose-broth over an inspissated serum slope, the medium being covered with a layer of liquid paraffin. Experimental cultures were grown in broth containing 2 per cent glucose and 7 per cent liquid horse serum. The inoculum gave an initial count of 200,000 organisms per ml. Without serum no significant multiplication took place; but when present in the medium a population of up to ten millions per ml. was obtained.

Preliminary investigations led to the preparation of a water-soluble extract of inspissated serum which would support growth when added to glucose broth. It was prepared by steaming together for 45 min. equal volumes of inspissated serum and distilled water. The final *p*H was 8. After steaming, the extract was cleared in a Seitz filter and then freeze-dried. The extract could be dialysed without loss of activity. When added to 2 per cent glucose-broth to give a concentration of approximately 0·15 per cent in terms of its protein content, optimum growth was obtained which could be serially subcultured. The extract contained a considerable amount of protein which could be precipitated by trichloracetic acid or by heating at *p*H 5.

The following analyses on a sample of the freeze-dried extract were kindly carried out by Dr. Winifred Watkins, who reported the material to contain total nitrogen, 10·5 per cent; total phosphorus, 0·6 per cent; inorganic phosphorus, 0·005 per cent; reduction and hexosamine (after hydrolysis for 8 hr. at 100° with 0·5 *N* hydrochloric acid), 4·6 per cent and 2·4 per cent respectively. The substance gave