being performed. In many cases there would appear to be no necessity for such large numbers merely for phagocytic purposes, although a purely physical explanation may be possible. Is it possible, therefore, that certain leucocytes may be potential germ-cells and only develop such potentialities in a suitable locus, the gonad, at a suitable time? Critical work which aimed at providing definite information on this problem would have great value whatever the result might be. Germ-cells, disguised as leucocytes—and not a few cases of such (as amoebocytes) are indeed known—could be pre-formed in the very earliest stages of development, and be subjected, while in the blood stream, to the maximum net and accumulative effect of the environment on the individual.

That this interpretation is not outside the region of probability may be deduced from Woodger's observations on the origin of the germ-cells of the fowl (*Q. J. M. Sc.*, **69**, p. 460; 1925), and Simkins on *Trionyx* (*Am. J. Anat.*, **6**, 36; 1925). The former states (italics are mine), "I feel no doubt about the continuity of the *primitive germ-cells* of the genital ridge with those of the splanchnic mesoderm of earlier stages, and with the *large cells of the blood-stream* in still earlier ones"; the latter finds that "*Isolated blood-cells* before the origin of the germ-gland rudiment more nearly answer to the requirements of *primordial germ-cells* than any other cells encountered."

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High Frequency Discharges in Gases.

IN the issue of NATURE for Feb. 4, Messrs. Taylor describe a 'new form' of high frequency discharge in gases at low pressures. This type of discharge is one of those which may be obtained when the gas is acted upon by an oscillatory force, derived either from a Tesla transformer where the oscillations are damped or from a generator performing continuous oscillations, and they occur in various forms, many of which are quite well known. The methods of maintaining continuous oscillations at high frequency by means of valves have added additional interest to electrodeless discharges as they provide a means of attaining a steady state of ionisation in the gas so that the currents and the potentials at the electrodes corresponding to the various forms of the discharge may be accurately measured. For this reason they have been included in the experimental courses in Oxford, and doubtless at other universities, and it may be of interest to describe a few of the more striking features which can be made the subject of simple experiments. Luminous discharges in gases may be maintained with long wave oscillations or with oscillations of a few metres wave-length. The resulting phenomena are much the same whether the potentials be applied between external or internal electrodes.

The distribution of the luminosity depends on several factors: the shape of the discharge vessel and the position of the electrodes, which may be internal or external; the nature and pressure of the gas; the applied potential and its frequency. Taking the very general case of a cylindrical tube 1 metre long and 3 cm. in diameter, with two external electrodes wrapped round in the middle of the tube about 10 cm. apart, the following are the main features of the discharge which may be observed as the pressure is reduced. Neon may be taken as an example of a gas which gives brilliant discharges over a large range of pressures from 50 mm. to 10^{-2} mm. of mercury, using a generator kept in oscillation by a 30-watt valve.

At comparatively high pressures the discharge takes place only in the gas nearest the two electrodes. As the pressure is reduced the luminosity extends along the tube until it fills the whole space between the electrodes. With further decrease in pressure the luminous column increases beyond the electrodes, and will finally fill the whole length of a very long tube. Still further decrease in pressure brings a contraction of the length of the luminous column together with a decrease in its intensity. When the pressure of the gas is of the order of 10^{-4} mm. a quite different phenomenon appears. The luminosity breaks up into sharply defined balls of light, sometimes perfect spheres, but in cylindrical tubes usually egg-shaped. Argon shows this phenomenon best, and gives an 'egg formation' with an exceedingly sharp boundary. In general, three balls of luminosity appear; one in the middle between the electrodes and one in each of the spaces beyond the electrodes, but by varying the applied potential it is possible to have one, two, or three 'eggs' existing together or separately.

At pressures of this order it is found that the discharge is maintained much more easily in the vessels of larger volume and in vessels of certain shapes, it is possible to have the discharge entirely outside the electrodes. Further reduction in pressure brings a decrease in the size of the 'egg,' and finally it disappears, leaving a slight diffused illumination from the gas. At very low pressures the glass between the electrodes begins to glow a red colour, and will show a greenish phosphorescence for some seconds after the stopping of the discharge. Quartz will continue to give out a green glow for many minutes after the discharge has stopped. If the quartz be heated above 150° C. it will phosphoresce very brightly for more than an hour, even though the heating be applied many hours after the discharge. Heating to about 600° C. will destroy this power of phosphorescence in quartz. Different types of glass do not seem to phosphoresce on heating.

When a discharge is passed through neon, at 5 mm. pressure, which contains mercury vapour as an impurity at a pressure corresponding to the saturation pressure at ordinary temperatures, and the discharge is passed between electrodes round the neck of a tube leading from a large bulb, it is found that the neon spectrum is developed very strongly in the narrow tube with very faint mercury lines, but in the bulb the spectrum is almost exclusively that of mercury. The neon spectrum appears in the strong, the mercury in the weak, part of the field. In general it may be noted that in monatomic gases impurities show themselves in the spectrum to a greater extent in the vessels of large volume where the field is relatively weak and at the higher gas pressures.

Various experimenters have measured the potentials to maintain these discharges under different conditions. One need only mention the researches of Gutton, Kirchner, Gill and Donaldson, and Townsend.

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Origin of the Semi-diurnal Pressure Wave in the Earth's Atmosphere.

THE small semi-diurnal wave of atmospheric pressure has long been recognised as a world-wide phenomenon. Simpson (*Q. J. Roy. Met. Soc.*, **44**, pp. 1-18; 1918) showed ten years ago how closely its value at individual places corresponds with the resultant of two twelve-hour vibrations, one parallel to the circles of latitude and one parallel to the meridians, as suggested originally by Schmidt (*Meteorologische Zeitschrift*, **7**, p. 182; 1890). The