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ENGINEERING PROGRESS AND THE SOCIAL ORDER[1]

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AT a time like the present, we all realize that something is on trial. Without perhaps being particularly aware of it, civilized man the world over is engaged in sifting and weighing evidence and will sooner or later reach certain conclusions. These conclusions are likely to be of fundamental significance as regards the future ordering of public judgment, and will differ no doubt in important respects from the basic tradition which, in the past, has been acceptable and accepted in guiding much of our action.

It would be very interesting to discover just what it is that stands before the bar. It may be fundamental science, it may be applied science, it may be science and technology in general, it may be religion, it may be domestic politics or world politics, or it may only be that old and primeval scapegoat, human nature, whom the bailiff never tires of bringing to book and who, we now begin to suspect, is quite incorrigible.

Here in brief is the setting for any contemporary discussion of science and technology and their repercussions on the social order. In attempting to identify what is here somewhat loosely designated as the culprit, it is perhaps well to recognize that the public at large will make up its mind irrespective of what any few individuals decide. However, a correct analysis is none the less important because every cor-

[1] Address delivered before the Section on Natural Sciences of the University of Pennsylvania Bicentennial Conference, Philadelphia, September 19, 1940.

of the leading wire against the surrounding fluid. Its advantages are twofold: (1) With a metal shield there is always some space between the shield and the conductor, thus producing a condenser with the resulting disturbances usually seen on bending the metal shielded wire. In the type described, the KCl-salt bridge fills the space between the insulated wire and the outer cover entirely and follows uniformly any movement of the flexible lead. Merely a film of liquid or semi-liquid, as used in agar-KCl or similar bridges, is sufficient for the shielding. $BaSO_4$ or another x-ray-opaque material may be added when location of the electrode by fluoroscopy is desired. (2) The combination of the glass electrode and the reference half cell in one piece saves space and is easy to handle. Even a calomel or another reference half cell may be incorporated to form one piece with the electrode as seen in Fig. 1 b. The use of this type of shielded electrode is of particular advantage in the measurement of pH in body cavities.

A more detailed description of a measuring device, in which this type of shielded glass electrode is used in the determination of intestinal pH, with a report of clinical findings will be presented later.

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A DIRECT METHOD OF DETERMINING THE ERYTHROCYTE, LEUCOCYTE AND THROMBOCYTE COUNT OF FOWL BLOOD

A MODIFICATION of the Blain method of staining the leucocytes in bird blood yields a rapid, reliable means of enumerating the cellular elements of the blood in the counting chamber. Two solutions are employed, the first containing the stain and the second the preservative for the cells. Because granulocytes have an affinity for brilliant cresyl blue and lymphocytes for pyronin, a stock solution of these is prepared consisting of 1 cc of 1 per cent. aqueous brilliant cresyl blue and 0.25 cc of saturated aqueous solution of pyronin (1 gram in 15 cc of water).

The first solution for staining used in the method described herein consists of 0.2 cc of the stock dye mixture in 25 cc of normal saline. This is filtered once through neutral paper. The second solution is that employed by Blain—12 per cent. of formalin in Locke's solution.

Blood is procured from the wing vein, and immediately after puncture it is drawn up to the 1 mark in the red-cell counting pipette. The pipette is then half filled with the first solution, gently rotated for about five seconds, and then filled to the 101 mark with the second solution and shaken for half a minute to mix. Counts may be made at once, although better differentiation is obtained if the mixture is allowed to stand 15 minutes or more. Thin covers, not more than 0.5 mm in thickness, are used, and the preparation is studied under a 4 mm objective.

The erythrocytes appear as pale oval discs with the nuclei sometimes barely perceptible. The thrombocytes vary from pale ovals slightly smaller than the erythrocytes and with a single polar granule, to small lance-shaped, faintly lilac-colored bodies. The latter type tends to occur in clusters and is more numerous in specimens made just before clotting begins, *i.e.*, after one or more pipettes have been filled in succession from the same puncture. The heterophiles take varying quantities of the blue dye and stand out sharply as blue-black bodies slightly smaller than the erythrocytes. The lymphocytes are uniformly round, faintly pink bodies, clearly distinguishable from thrombocytes, which in their colorless state appear to belong more to the erythroblast series. Monocytes are indistinguishable from the large lymphocytes, but since this is not primarily a differential count, that is not important.

Checked against Shaw's method over a series of blood counts on the bobwhite quail, this method gives approximately the same total leucocyte count and has the added advantage that the solution is more stable than Shaw's. The solution containing the dye will keep for about a week. The stock solution is less stable, but the dyes kept separately in solution are good indefinitely. The formalin solution must be made fresh each day, but adjustment of the pH and temperature are unnecessary.

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U. S. BIOLOGICAL SURVEY,
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BOOKS RECEIVED

BERNSTEIN, BLANCHE. *The Pattern of Consumer Debt, 1935–36.* Pp. xviii + 238. National Bureau of Economic Research, New York. Illustrated. $2.50.

BIRCHER, LOUIS J. *Physical Chemistry.* Pp. xvi + 429. 75 figures. Prentice-Hall. $3.00.

BROWN, THOMAS B. *Foundations of Modern Physics.* Pp. xii + 333. 155 figures. Wiley. $3.25.

DEMING, HORACE G. *Fundamental Chemistry.* Pp. xiii + 756. 195 figures. Wiley. $3.50.

ELDRIDGE, JOHN A. *College Physics.* Second edition. Pp. xii + 702. Illustrated. Wiley. $3.75.

ENGELDER, CARL J., TOBIAS H. DUNKELBERGER and WILLIAM J. SCHILLER. *Semi-Micro Qualitative Analysis.* Second edition. Pp. xii + 305. Wiley. $2.75.

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RICHTER, GEORGE H. *Laboratory Manual of Elementary Organic Chemistry.* Pp. ix + 128. Illustrated. Wiley. $1.25.