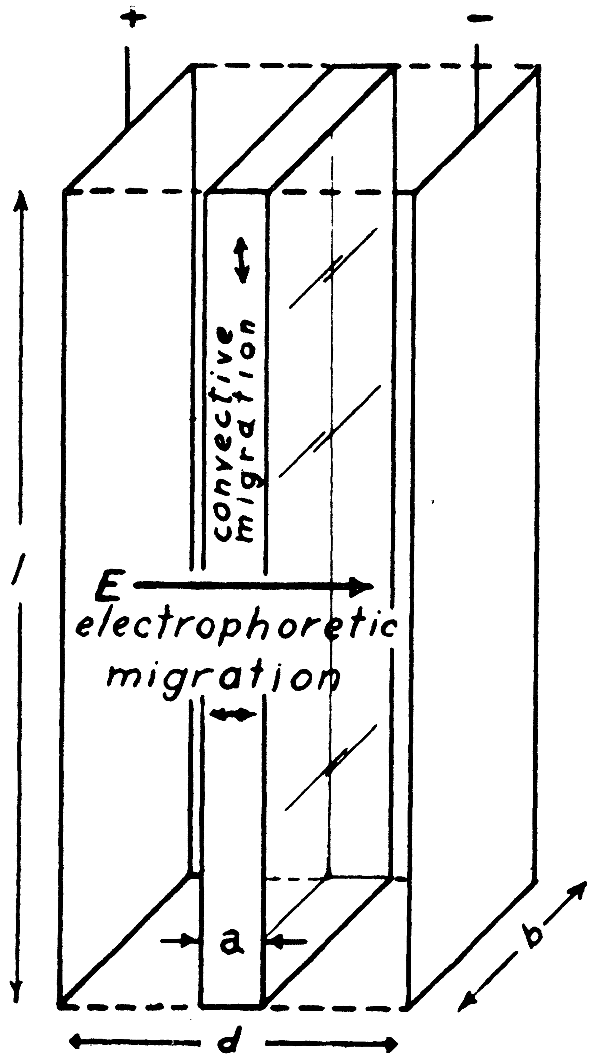

FIG. 1. Electroconvection channel, diagrammatic, showing spatial relationships of channel dimensions and electric field to directions of migration. In equation (3) the field is assumed to be restricted to the volume enclosed by the dashed lines.

As a practical matter, the limiting factor in the operation of electroconvection apparatus is the power consumed in the entire apparatus rather than in the channel alone. The overall power consumption H_0 equals vI, where v is the voltage across the electrodes. This power appears almost entirely as heat, since the work of separation performed in the apparatus is a small fraction of the total.

For maximum efficiency, the electrodes must be placed as close to the channel faces as possible, so as to reduce the amount of power wasted outside the channel. With this condition the electric field is largely confined to the rectangular parallelepiped defined by the channel and the two electrodes (dashed outline in Fig. 1). Assuming that the conductivity of the solution is equal to that of the buffer,

$$H_c = \frac{a}{d} H_o = \frac{avI}{d}$$

where d is the distance between the electrodes. Substituting in equation (2), θ is given by

$$\theta = \frac{2VDdk}{h\mu^2 H_o} = \frac{2VDdk}{h\mu^2 vI} \qquad (3)$$

Thus θ can be calculated with sufficient accuracy for practical purposes from the voltage and current through the apparatus.

The heat produced in the apparatus may be removed by circulating the external buffer through a heat exchanger. At a power level of 100 watts, buffer circulation at the rate of 50 l/hr through a cooling coil immersed in ice maintained the temperature at 4° C.

In the above equations there is a dependence of θ on the inverse fourth root of the height of the channel. This suggests that the channel should be high and narrow rather than low and broad to obtain small transport times. A ratio of height to width of about 10 to 1 has been found practical. Increasing this to 20 to 1 theoretically increases the efficiency by 18%, but introduces unwanted effects of drag from the side walls on the convection currents.

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Applicability of the Du Bois Height-Weight Formula for Measurement of Body Surface of Indian Subjects

HUMAN body surface area is usually computed from the Du Bois height-weight formula (*1*) $A = W^{0.425} \times H^{0.725} \times 71.84$, where A = surface area in cm², W = weight in kg, and H = height in cm. The present work was carried out to assess how closely the surface area of Indian subjects as measured by a suitable standard method agrees with that computed from the Du Bois height-weight formula that was derived on the basis of measurements taken on European subjects.

For the purpose of the present work, Du Bois linear formula method (*2*) has been adopted as the standard method. The accuracy of the above simple method has been found by Sawyer *et al.* (*3*) to be the same as that of the mould method and further it is not likely to be affected by racial factors (*4*).

In the present investigation, measurements were made on 18 healthy Indian male subjects of different body builds, their heights ranging from 5 to 5 ft 11.5 in. and weights from 90 to 158 lb.

The average error of the values computed from the formula as compared with the measured values worked out to be 1.5%, the mean error – 0.5%, and the standard deviation of the errors 1.8%.

Statistical analysis of the errors leads us to the conclusion that for all practical purposes Du Bois height-weight formula can be made use of for computing the body surface of Indian subjects also.

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The Scientist and the Library Cataloguer

Mr. Roger Poulin has commented (Science, 117, 538 [1953]) on the difficulty of classifying a book so as to satisfy everybody: ". . . one man's orderly arrangement may be another's hodgepodge," he quotes. He is right, but to suggest that the author of a book should state where it is best classified does not ease the difficulty, for the author is himself only one man. The best place to classify and shelve a book will vary from one special library to another, according to the interests of the readers served.

But this is not the end of the story. A general library has to cater for varied interests. It must be admitted that simple classification alone, putting a book at one point in a unidimensional arrangement, cannot do this effectively. It is the function of a library catalogue to bring out alternative positions in the arrangement which a book might occupy, and so to make up for the limitations of the classification.

The essential point about the book cited by Mr. Poulin (Rugh's, *The Frog: Its Reproduction and Development*) is that it is not simply about either frogs or embryology: the subject is compound. Both aspects must be recorded in the catalogue, so that readers are led to this book and associated books whether they are interested in amphibians or embryos. The cataloguer will be helped in this task if the classification of the book already clearly reveals the compound nature of its subject. An enumerative classification like that of the Library of Congress fails to give this help: the book must be labeled either QL668.E2 (Salientia) or QL959 (vertebrate embryology).

A synthetic classification, on the other hand, sets out separate schedules for each of the various aspects of biology, and forms its class number by linking together numbers drawn from two or more appropriate schedules. Thus the Colon Classification of the Indian Ranganathan would number Rugh's book K9325: 7, where 9325 (Anura) is drawn from a taxonomic schedule, and 7 (ontogeny) from another schedule. The cataloguer can immediately translate these two parts of the number into appropriate subject headings.

The working out of sets of independent schedules of primary terms that can be combined to represent compound subjects is occupying the minds both of classificationists and of punched-card users, as the latter combine terms in a very similar way. It is in this work that the scientist can help greatly, for the value of any classification scheme rests on the accuracy with which its basic schedules reflect modern knowledge.

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A Collecting Device for Obtaining Blood Samples at Various Intervals from an Intra-Arterial Catheter

The development of polyethylene catheters suitable for insertion into arteries provides a convenient method for repeated or continuous sampling from these vessels. It is desirable to keep the catheter as small as possible, not only to facilitate insertion but also to minimize the chance of hematoma formation after the catheter is withdrawn. When this technique was applied to the collection of arterial blood in the determination of cardiac output by the Evans' blue method as described by Hamilton, it was found that sufficient blood could not be collected through the small polyethylene catheter (outside diameter, 0.965 mm; inside diameter, 0.58 mm) in the 2-sec sampling

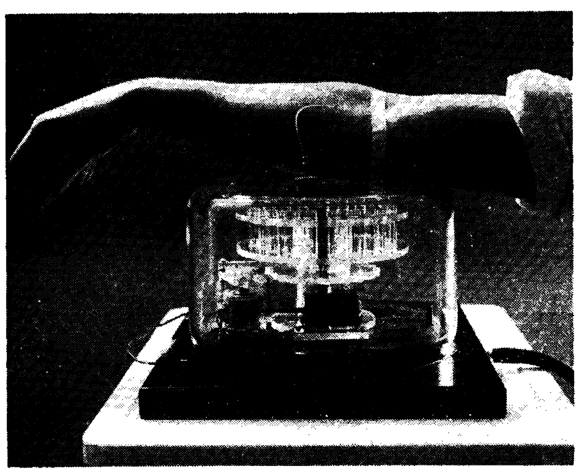

Fig. 1. Complete collecting device ready for operation. The tubing at the right is the connection to the vacuum pump. The relay for activating the ratchet is at the left, under the tube carrier. The solenoid, for returning the ratchet to its resting position, is centrally located, also under the tube carrier.