seems probable that integers were used before the common fractions were employed, but the fact that in our modern languages the number one-half has a name which is independent of the name for two points to the very early use of common fractions. The scale downwards from unity was probably almost as important in the early steps towards civilization as the scale upwards, but such questions can obviously never be decided from historical evidences.

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CROSS REFERENCES IN SCIENTIFIC LITERATURE

THE effective compilation of data is almost inevitably complicated by the necessity of a suitable means of indicating cross references. Since the secretarial work involved often becomes burdensome, the following system is suggested:

References are taken on standard size index cards, the six by four inch cards being very satisfactory. These are filed alphabetically according to the name of the author. The subject being investigated is divided into appropriate topics and a key card is prepared. The top margin of the key card is divided into vertical spaces about one fourth inch apart, and a topic assigned to each space so provided. If, for example, the first topic selected is "the reaction of the culture media," all cards treating this subject will be marked on the upper margin one fourth inch from the left margin. If "culture characteristics" is the next topic, all references concerning this subject will be marked one half inch from the left margin. "Scotch tape" in various colors, red, blue and green can be used to mark the upper margin of each card. If a reference card contains information concerning more than one of the topics suggested it may be marked in as many places as necessary on the upper margin. The use of various colors makes it possible to divide the upper margin into more spaces than would otherwise be possible. If three colors are used there will be a repetition of one color every three fourths of an inch. Brass paper clips were previously used but the top margin of the cards was so thickened that the index became unwieldy. In addition to the variety of colors, the "Scotch tape" has the advantages of being thin and its use on the card does not cause the upper margins to become unduly thick. The number of cross references is limited by the size of the index card, but the simplicity makes an effective system possible with a minimum amount of effort.

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OVEREXERTION AS CAUSE OF DEATH OF CAPTURED FISH

MOST kinds of fishes die very quickly when removed from the water. As an example, herring on being taken out of the water flop about very vigorously and die in a few minutes with the symptoms of asphyxia. Some kinds, however, remain alive for a considerable time under such conditions. The eel (*Anguilla*) may remain alive for days out of water in moist situations, and the same is true for the catfish (*Ameiurus*). Since the obvious changes in the dying fish are those associated with suffocation in air-breathing vertebrates, such as mammals and birds, and since the fish is out of its natural environment, water, for which its respiratory mechanism is suitable, it is natural to conclude that the death of the fish is due to interference with respiration. Nevertheless, proof has been lacking that in air the gills are less able to transmit oxygen to, and remove carbon dioxide from, the blood than when they are in water.

As a matter of fact, death occurs in many captured fish, such as herring, even when they are not removed from the water. Herring do not survive very long when caught in nets, whose meshes permit them to pass through as far as the dorsal fin, but no farther. Although the fish are said to be gilled since the gills prevent them from backing out, there is no interference with respiration, the net holding them by the middle of the body. Among sea fish that are taken regularly by baited hooks on set lines (the "long lines" of British fishermen and the "bultows" or "trawls" of fishermen on the western side of the North Atlantic), the haddock is one that dies very quickly whether removed from the water or merely caught and held. It may be maintained that, with a hook in its mouth, the haddock is unable to breathe properly, but I have failed to get evidence that this is true.

Ritchie,[1] in studying *rigor mortis* in fish, particularly members of the cod family (*Gadidae*), found captured haddock, cod and hake (*Urophycis*) to have 0.15, 0.08 and 0.05 per cent. respectively of lactic acid in their muscles, representing increases above the amount in resting muscle due to various degrees of fatigue. The differences in degree of fatigue between the three species was considered to correspond with differences in the "usual notion of their muscular activity." Macleod and Simpson[2] found that haddock captured on "trawls" and examined within 2½ hours after being hooked had practically no glycogen in the muscles, but those taken quickly on hand lines had from 0.04 to 0.22 per cent., the difference being attributed to more struggling when a long time on the "trawls." The absence of glycogen would be due to

[1] A. D. Ritchie, *Jour. Physiol.*, 60: 1–2, 1925.

[2] J. J. R. Macleod and W. W. Simpson, *Contr. Can. Biol. N. S.*, 3: 439–456, 1927.