Recent experiments by the writers indicate that the orientation is a function of the viscosity of the liquid. For example, the horizontal position is the position of stability for glass disks settling in water or other media of low viscosity. In a medium of high viscosity, the disks will orient themselves vertically.

A very simple and beautiful demonstration of this change in the position of stability can be made by filling a large jar two-thirds full of Karo syrup, and then filling the rest of the jar with water. When these are imperfectly mixed, the viscosity of the liquid increases toward the bottom of the jar. If now a cover-glass is dropped into the jar, it will orient itself horizontally during the first part of its fall. As it settles into the liquid of higher viscosity, this is no longer the position of stability, and it is seen to turn on edge and dive toward the bottom.

The orientation is also a function of the velocity of fall. The higher the specific gravity of the disk the deeper it will sink in the jar before turning from the horizontal to the vertical position, thus the more viscous will be the liquid at the point of turn.

This dependence of orientation on viscosity is of interest to geologists in connection with crystal subsidence in a magma reservoir. It may also explain hitherto unsolved problems in the orientation of fragments in sedimentary rocks.

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THE EXPERIMENTAL MARKING OF HALIBUT

MARKING experiments with live fish in connection with the life history studies of the important species are being carried out by many governments that have commercial fishing interests. These experiments yield indispensable information on the migration of the fish, their rate of growth and the intensity of the fishery. The type of mark that can be attached to the fish varies with the species, but all investigators are agreed that the ideal mark must be one that can not be lost from the fish or overlooked by the fisherman who catches the fish and returns it. The greatest possible accuracy is desirable in determining the mortality rates and migrations from the returns.

The International Fisheries Commission has been charged by treaty to investigate and regulate the Pacific halibut fishery. Its staff has used a monel metal strap tag attached to the opercle of the eyed side of the fish. In the undoubtedly successful and extensive marking experiments it has conducted some question has remained as to whether some tags were not lost from the living fish or overlooked by the fishermen. New marks to be affixed to the halibut in addition to the present monel tag have been devised. It is believed they may prove of general application to investigations of this type. The marks experimented with are of two types.

First, a tattoo mark consisting of the initials I. F. C. and a number was made on the cheek or nape of the neck on the white side. The number was added so that in case the strap tag should be lost the date and locality of marking could still be traced. The tattooing was done with Higgins American Waterproof India ink and a hypodermic needle attached to a small metal hypodermic syringe. With each puncture of the needle a little ink was pressed in and sufficient punctures were made to form the letters and number indicated above. The whole procedure took less than one minute to perform.

Second, tags were placed in the body cavity of the halibut. These were manufactured from No. 60 orange-red celluloid and stamped with a number and legend for recovery. They were 64 mm long by 22 mm wide at one end, tapering down to 18 mm at the other. This tapering was made to facilitate the insertion of the tag through an incision made on the posterior part of the abdomen on the eyed side, the incision being just large enough to admit the small end of the tag. The tag when inserted into the body cavity is lodged among the intestinal caecae, and is recovered when the fish is being eviscerated. The chances for its recovery have been greatly improved since the livers of the fish are now carefully removed from among the viscera and are sold for medicinal purposes.

In May and June, 1935, 596 halibut were tagged on the Goose Island Grounds situated in Queen Charlotte Sound, British Columbia. Of these 343 were tattooed and 253 were marked with the celluloid body cavity tags. Up to September 6, 1935, when this general area was closed to commercial fishing, there have been 28 or about 8.2 per cent. of the tattooed fish returned and 12 or 4.7 per cent. of those carrying the celluloid tags. No tattooed fish or those carrying celluloid tags were recovered without a metal tag still firmly attached.

Of the 28 returns with tattoo marks it was found that this mark was noticed before the metal tag in 24 cases, and in two cases it was noticed on the fish in the water before it was landed. In every case the tattoo mark was almost as clear when recovered as when it was put on. Microscopic examination reveals that the carbon particles of the ink have lodged in the scale pockets, epidermis and underlying muscle tissue, and the surface particles of ink have been covered by a thin layer of transparent epidermal tissue. This epidermal regeneration is complete in every case after the fish have been at liberty for 30 days or more. The longest period of liberty to date is 99 days. It is believed, then, that this mark should be permanent unless the carbon particles are later absorbed.

In two out of the twelve fish recovered bearing the body cavity tags the celluloid tag was noticed before the metal tag and in one case the celluloid tag was completely overlooked. The incision was completely healed in every case after the fish had been at liberty for 70 to 80 days. The longest period of time that any of these fish were out is 89 days.

It would be premature as yet to give a definite estimate of the value or the permanency of these marks or their superiority over the strap tag. If the tattoo marks do not fade over a greater period of time than is here recorded, this type of mark would be almost ideal for the halibut; and if it is used in addition to the regular strap tag, as was done in the present experiment, it should aid in the recognition of very nearly all the tagged fish that might be recovered. Furthermore, it would give a clue to whether and in what numbers strap tags have been overlooked or lost in past experiments. This the body cavity tag may also do, though a somewhat higher mortality from the effects of this mark is indicated.

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RUBBER CONTENT OF GOLDENROD LEAVES AFFECTED BY LIGHT

THE leaves of the many wild species of goldenrod (Solidago) contain rubber, frequently to the extent of 3 to 6 per cent.;[1] and as much as 13 per cent. has been obtained from cultivated plants in experiments initiated by the late Thomas A. Edison at Fort Myers, Florida. The rubber content increases with the maturity of the leaves, but as soon as the leaves die they lose most of their rubber, whether remaining on the plants or lying on the ground. With a view to learning whether light is a factor in the rapid decline of rubber in the dead leaves, samples were exposed to sunlight in Cellophane envelopes of different colors for various periods of time. The use of Cellophane was suggested by Flint's work on light-sensitive lettuce seed.[2]

Three species of Solidago were included in the test, *Solidago leavenworthii, S. altissima* and *S. fistulosa,* and the leaf samples were exposed in red, blue, green and clear envelopes. Check samples in black paper envelopes were exposed with the colored envelopes. The leaves exposed in the red, green and blue envelopes showed notable losses in rubber content, and those in the clear envelopes lost most of their rubber, while material from the black envelopes showed no loss, but often a gain. Samples of *Solidago leavenworthii,* which analyzed 4.39 per cent. of rubber at the beginning of the experiment, gave the following percentages after one week of exposure in the different envelopes: clear 3.38, red 3.63, green 3.75, blue 3.89 and black 4.72. The corresponding percentages after two weeks of exposure were 1.98, 2.69, 2.74, 3.28, 6.27; after four weeks 2.00, 2.69, 2.94, 3.28, 6.00, and after six weeks 1.81, 2.25, 1.97, 2.65, 5.98. Results with the other species were consistent, and the data leave no doubt that light is a factor in reducing the rubber content of goldenrod leaves after harvesting.

Analyses were made later of leaf material from the envelopes that had been exposed and then stored for several weeks in the laboratory, and it was found that the rubber content of the leaves in the black envelopes had not declined but had increased, while material from the colored bags showed a further decline in rubber content. Thus the black-envelope sample of *S. leavenworthii,* that analyzed 6.27 per cent. after two weeks' exposure in the field, contained 7.34 per cent. after six weeks in the laboratory, and likewise the samples exposed for four and six weeks increased after two weeks in the laboratory, from 6.00 to 7.12 and from 5.98 to 6.70, respectively. These data were obtained from samples grown at Glenn Dale, Maryland, and were confirmed by samples from Savannah, Georgia, and Fort Myers, Florida, that had received similar treatment.

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[1] Loren G. Polhamus, *Jour. of Agricultural Research,* Vol. 47, No. 3, Aug. 1, 1933, pp. 149–152.

[2] Lewis H. Flint, SCIENCE, Vol. 80, pp. 38–40, 1934.

THE YOUNGEST MEMBER ELECTED TO THE NATIONAL ACADEMY OF SCIENCES

IN the minute on Carl Barus (1856–1935) published in SCIENCE for November 22, 1935, pp. 481–483, Professor Lindsay and I wrote that at the age of 36 Dr. Barus was elected "a member of the National Academy of Sciences in 1892—the youngest man [that is, in 1892] who had ever been so honored." This unchecked statement was taken from an autobiographical sketch. A friend has drawn attention to one of my own articles on Simon Newcomb (1835–1909) published in SCIENCE for December 22, 1916, p. 872, where I noted that Newcomb became a member on September 1, 1869, when 34 years of age. Professor J. McKeen Cattell has informed me that at a later date, namely 1899, Theodore W. Richards was elected a member at the age of 31. Has any member been elected who was younger than 31?

While referring to the National Academy may I point out the great need for a volume containing a