ON THE DAILY MOVEMENTS OF THE COREGONINE FISHES

By JOHN LAWSON HART

THE occupation by fish of an element different from our own unfortunately results in our knowledge of their movements being dependent on circumstantial evidence rather than upon direct observation. The conclusions of the present contribution are drawn from such circumstantial evidence and they are presented in the belief that data better in kind are unlikely to be available.

In order to gain information on the time of day at which fish are most active, a gang of gill nets was lifted at sunrise and sunset each day and was returned to the water in the same place immediately after removing and recording the fish taken in it.

The gang of nets used in the experiment consisted in the following order of one hundred and fifty foot lengths of four and one-half, three, and, one and one-half inch gill nets and fifty-foot lengths of five, four and one-half, four, three and one-half, three, two and one-half, two, and, one and one-half inch gill nets.

The experiment was carried out in Macdiarmid harbour in Lake Nipigon. The gang of nets was set approximately parallel to shore in the southern parts of the harbour. Depths at different parts of the net were as follows: at the four and one-half inch end, sixty feet; at the middle, thirty-eight feet; at the one and one-half inch end, twenty-eight feet.

The experiment continued for four days from September 10, 1925, to September 14. The nets were visited in the morning between six o'clock and a quarter after six o'clock, in the evening between seven o'clock and half-past seven o'clock. Accordingly, the nets were in the water for approximately eleven hours during the night and thirteen hours during the day.

Seven species of fish were taken in the nets during the course of the experiment: the common whitefish, *Coregonus clupeaformis* (Mitchill); the cisco, *Leucichthys* sp.; the round whitefish, *Prosopium quadrilaterale* (Richardson); the common sucker, *Catostomus commersonii* (Lacépède) the pike, *Esox lucius* Linnaeus; the yellow perch, *Perca flavescens* Mitchill; and the sauger, *Stizostedion canadense* (Smith).

In the accompanying table are shown the times and dates when the various species were taken. The size of the net which has no direct bearing on the matter under discussion has been omitted in order to simplify the table.

Date 1925	Kind of Fish	Number taken from nets in morning	Number taken from nets in evening
Sept. 11....	Common whitefish.....	3	1
	Cisco.....	2	—
	Round whitefish.....	1	—
	Common sucker.....	4	3
	Pike.....	1	1
	Yellow perch.....	—	1
	Sauger.....	—	2
Sept. 12....	Common whitefish.....	4	—
	Cisco.....	2	—
	Common sucker.....	1	5
Sept. 13....	Common whitefish.....	2	—
	Round whitefish.....	2	—
	Common sucker.....	1	2
Sept. 14....	Common whitefish.....	2	—
	Cisco.....	2	—
	Common sucker.....	1	—
Four days..	Common whitefish.....	11	1
	Cisco.....	6	—
	Round whitefish.....	3	—
	Common sucker.....	7	10
	Pike.....	1	1
	Yellow perch.....	0	1
	Sauger.....	0	2

The results of the experiment as illustrated in the table show that in Lake Nipigon at the depths and season of the investigation, coregonine fishes (ciscoes and whitefishes) are captured in greater numbers at night than in the daytime. This may be considered as proof of considerable activity during the night at least. The failure to capture coregonine fish during the daylight hours may be due either to comparative quiescence during the day or to their ability to avoid the net in better light. The latter possibility appears less likely in view of the capture of rather greater numbers of the suckers, pike, saugers and perch during the day time. There can be little doubt but that a difference in habit between coregonine and the other fishes in Lake Nipigon is indicated by the results. However, an attempt to repeat the experiment in water of greater depth in Lake Ontario failed to give corroborating results.

It is of interest to note the way in which the catch fell off during the experiment. This may have been due either to catching out the fish in the immediate vicinity of the set or more probably to a reduction in the efficiency of the nets resulting from four days continuous use without either drying or liming.

The experiment was carried out by an Ontario Fisheries Research Laboratory field party consisting of Prof. W. J. K. Harkness, Dr. D. S.

Rawson and the writer. Without the financial assistance of the laboratory and the cooperation of its personnel, the experiment would have been impossible.

WHAT IS MEANT BY THE TERM "WILD LIFE CONSERVATION?"

By J. A. MUNRO

WE ARE accustomed to hearing that our wild life is a national possession which we hold in trust for posterity. We have seen the caption *Wild Life a National Heritage* on many a newspaper article dealing with conservation. So often have these words been used, by sportsmen and by conservationists, that the phrase has almost become a slogan, and, as often is the case with slogans, there is danger that the meaning be lost in the rhythm of the words.

Just what, exactly, is meant by the term wild life?

I take it that a literal interpretation is not intended as this would include all wild living things. So the term generally is used in a restricted sense to include only wild birds and mammals and with this definition there is no present quarrel.

But, there is an increasing tendency upon the part of some sportsmen to indentify as wild life only certain bird and mammal species which are classified as game, and to foster the increase of these species at the expense of all other birds and mammals. I submit that under such a policy our wild life will cease to be a national possession and become the heritage of a class which is relatively few in number.

Considering the meaning of the word conservation as applied to wild life its connotations are many and varied. To some people it suggests merely restrictive legislation, to others it implies a policy of non-intervention. In my opinion the word implies:

1. Scientific research.
2. Adequate wild life sanctuaries.
3. Education of the public.
4. Law inforcement.

These are named in what are believed to be the order of their importance. Scientific research is held to be fundamental because knowledge must necessarily be the basis for the intelligent maintenance of wild life, for educating the public as to its value and for framing regulations as to its use.

In my opinion the term conservation does not imply a policy of hands off in connection with the maintenance of wild life. Certainly it does not mean that all bird and mammal species should be completely protected at all times and under all conditions. Most assuredly it recognizes the necessity of controlling certain birds and mammals whose increase in certain districts conflicts with agricultural and other interests. But certainly also it implies that some thought be given to the welfare of the native bird species which, although not classified as game, are of absorbing interest to many of our people. I refer to the hawks and owls and to non-game birds generally.

It is here that an apparent conflict of interests has arisen between conservationists. On the one hand the sportsman, who is working for the preservation of game birds and game mammals in order that the sport he loves may be perpetuated; on the other hand the nature lover who is concerned with the welfare of wild life in general. To the nature lover the future of, let us say, a grebe or a loon, almost any bird in fact, is just as important as the future of a game bird; whereas the attitude of many sportsmen towards general bird protection is apathetic, or even directly antagonistic. The sportsman's present warfare against hawks and owls illustrates the latter feeling. With the effect of this campaign against the raptores I am not at the moment concerned. I wish merely to point out the evil it has done to the cause of conservation, which is this: stirred up by broadsides of emotional propaganda, both for and against predatory bird control, conservationists have divided into two hostile camps and years of effort towards a sympathetic understanding between sportsman and nature lover may have been undone. Sane conservation may be endangered because the extremists on both sides of the argument are taking control. It has been suggested that hawks of all species should be exterminated so that no guilty individual may escape and it has been said that hawks of all species should be protected in order to prevent the killing of a single beneficial individual.

Undoubtedly predatory bird and mammal control has an important place in conservation but sportsmen are prone to emphasize this beyond all reason. It is stated frequently that if predators are killed off there will be no need for game laws—a wish certainly fathered this thought.

*A paper read at the bi-annual conference of Provincial and Federal Game Officials, Ottawa, August 21-22, 1930.