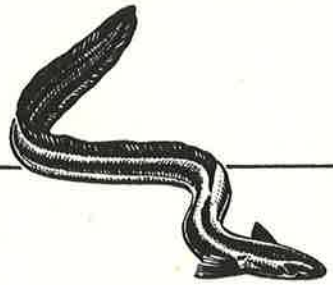


The National Anguilla Club

BULLETIN

Volume 7, Number 2. April, 1970.

CONTENTS.

EDITORIAL

At a recent NASG. meeting, it was reported that the National Anguilla Club was an 'highly disciplined' group. We are lost in admiration for their intelligence service, for we thought that the many Winter evenings spent by the Yorks sub-group practising rod-drill and casting-by-numbers were secrets known only to ourselves. Highly organised would perhaps be a more appropriate phrase, and it is as a result of this organisation that there can be only one way in which to open the Bulletin this month. This is simply to once again extend our thanks to our President (Field Marshall??), Terry Coulson for turning the mass of session report information into a truly magnificent special report for us.

I am sure that the fishing of every one of us will benefit as a result of this, which is another way of saying that the Session Report scheme is indeed fulfilling its prime objective. Not only this, but it is also apparent that each year the Special Report becomes more informative than the last, clearly indicating the soundness of the original scheme, and the value of collecting data over an extended period so as to allow some of the subtle, as well as the obvious, factors to show through.

To change the subject a little, it saddens me to have to report that only three of you (apart from those I met personally) managed to find the time to write to me about the suggestions made in the previous issue on unusual baits and groundbaiting trials. I can only hope that this does not reflect the general lack of interest that it appears to do, and that some of us, at least, will try to maintain something of the experimental approach to our angling upon which the vitality of the Club in the future must depend. As this subject was dealt with at the Spring GM., there is no point in my belabouring the matter here, except to make a couple of comments which I feel are worth making. The first is to reiterate Terry's comment that the stomach contents results do give support to the idea that molluscs in general are worthy of trial as baits. The second is to raise a question. What is it about the humble earthworm that the eel finds so hard to resist? Clearly master Anguilla rarely eats the thing in the wild, and no lobworms appear to have been recorded in the stonach contents. Perhaps it is just that the earthworm is inherently attractive. Perhaps, however, its value lies in the fact that, as far as the eel is concerned, it resembles a more normal food item fairly closely. If this should be so, it would behove us to try to find out what this food item might be.

On a more hopeful note, I am pleased to be able to say that this is something of a 'bumper' issue, at least with respect to the size of the last few Bulletins. Actually, I feel that the Bulletin presented here is getting towards being the right size, at last, and I would like to thank all those concerned who have contributed so well to the contents of this issue. Let us hope that this is indeed the turning of the tide, and that we can look foreward to even better things in the future.

Finally, as the weather has at last shown signs of realising that an improvement is long overdue (it has just lured your editor out for his customary first blank trip of the year), let me take the opportunity of wishing you all every success in the coming months; and to express the hope that, both collectively and individually, the improvement in Club fortunes over the past few seasons will be maintained in 1970.

Alan Hawkins.

SPECIAL FEATURE ON BITE-DETECTORS.

compiled by Alan Hawkins

In the Bulletin of December 1969, (vol.6,no.4), two articles appeared concerned with electric bite-indicators.A review of the essential features of the various types currently in use was presented by Dave Ball, and some of the theory behind the design of reliable units was considered by Alan Hawkins. In many ways, the present feature is an extension of these two pieces and for the sake of brevity points covered by them will not be raised again here, except in cases where the sense would be lost if this were not done. The purpose of this article is to supply as much detail as is felt necessary to enable any member to make for himself whichever type appeals to him most. Attention will be given only to those models which have proved their reliability in practice, for I know of few fields where the gap is greater between what works in theory and what actually happens.

Many of our members have contributed in one way or another to the contents of this, and I would like to express thanks to them for their fine efforts, which, of course, make my task considerably easier. So as to be able to present this as an integrated piece, I have abstracted freely from these contributions, stringing them together with words from my own pen. I hope those concerned will forgive these editorial liberties, and that, for once, the end may justify the means.

As explained by Dave Ball, there are two main types of sensor unit,-the antenna and the 'carpcatcher',-either of which may be seperate from the buzzer box or mounted on it to form a single unit. We will begin by considering seperate sensor devices (which are connected to the buzzer by a length of flex) and of these begin with the 'carpcatcher' type.

In essence this is a very simple thing, and the diagram below,(fig.1.), should convey the main principles of such a gadget.

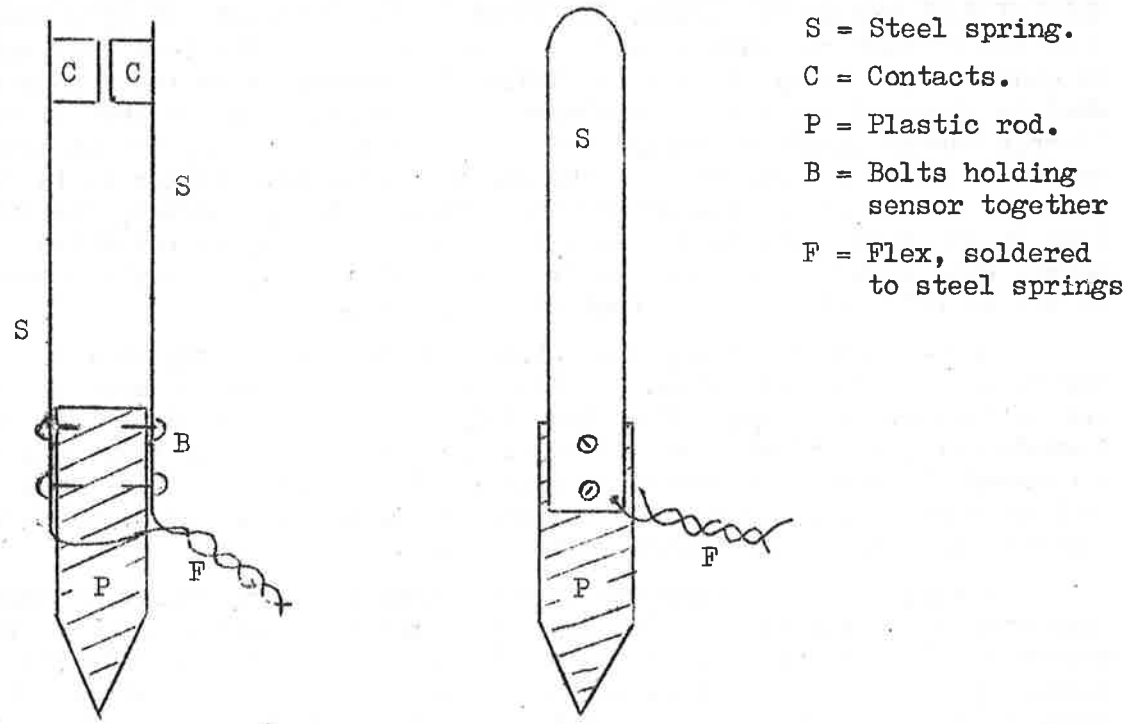


Fig.1. Original Version of 'Carpcatcher' Type.

In its original version it consisted of two lengths of spring steel mounted on a non-conducting rod (eg. plastic). The free end of the rod was stuck in the ground, and the steel springs projected vertically upwards. On the inner faces of the springs were soldered contacts, and the natural spring of the metal tended to bring these contacts together. A length of flex was taken from the springs and plugged in to the buzzer box. To operate, the sensor was planted between the reel and first rod-ring, and the line drawn down and inserted between the contacts thus holding them apart. A pull on the line from a fish jerked the line free, thus allowing the contacts to meet and sounding the alarm. It was, therefore, little more than a simple relay switch.

Stuck in the ground, this gadget is a bit sensitive to the weight of the angler's boot in an unguarded moment (as the editor well knows!), and there seem to be two ways in which this can be overcome, at least to some extent. Firstly the sensor can be raised off the ground, to be mounted horizontally;-a full discussion of this has already been published by Brian Crawford (NAC.Bull. 6,2. Aug. 1969)-and no more need be said here. Note also that this allows one to make the device more water resistant. Secondly we can make the thing stronger. The way that this could be accomplished was suggested by Geoff.Swailes; who pointed out that only one of the 'springs' need in fact be a spring at all, and that the other could be as rigid as one liked. This notion was seized upon by the editor, who also discovered that one could now incorporate a method of adjusting the sensitivity in the design. The result was a gadget which has so far worked extremely well, and one in which the editor has considerable confidence. The details are given in fig. 2, below.

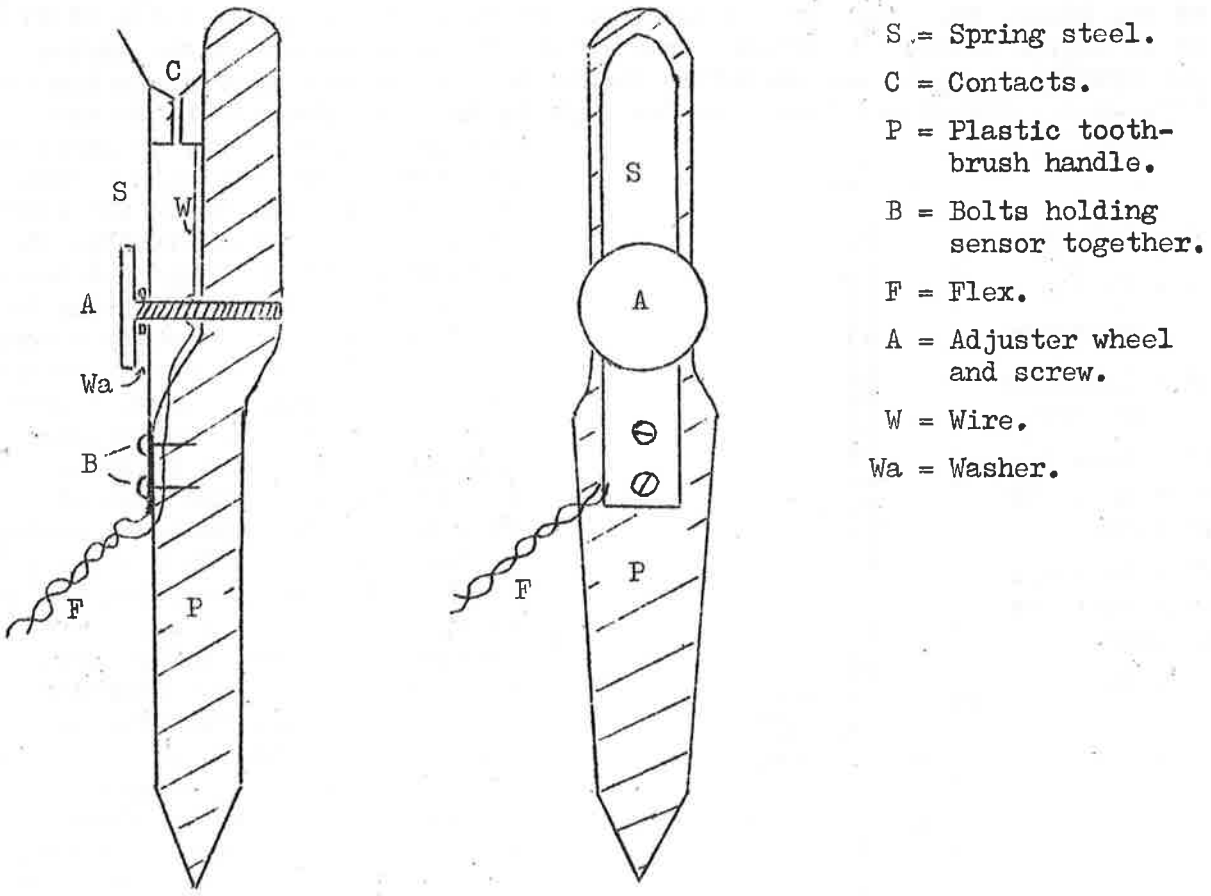


Fig.2. Modified 'Carpcatcher' Type.

The main item in this sensor is a discarded toothbrush handle with the bristles cut off. As in the rest of this article, we must lean rather heavily on the diagrams to explain themselves in order to cut the text down to manageable proportions. The single spring strip (S) is made from a piece of the steel used to bind up large packing cases etc, and is attached to the plastic handle (P) by a couple of bolts (B). Omitted from the diagram is a length of cloth tape, soaked in araldite adhesive, which is bound around the unit at this point to make the joint stronger. One contact (C) is soldered to the steel strip, the other glued to the plastic toothbrush handle with araldite. The steel strip itself carries the current from the contact to the flex soldered onto its other end; from the contact mounted on the plastic a wire is run down over the surface, (covered in araldite to hold it firm), to the region of the tape binding; where it is joined to the other piece of flex. Of special interest is the adjuster wheel and screw (A). The screw of this passes through a clearance sized hole in the steel strip and into a hole in the toothbrush handle which is tapped to take the thread. A washer (Wa) is included, and it will be seen that by turning the wheel the steel strip can be bent to increase or decrease the contact pressure. Thus the gadget can be adjusted to cope with varying conditions of current and wind drag. The contacts are as described in the previous article of Alan Hawkins already mentioned.

We may now turn to consider the antenna type of detector. All the models currently in use are incorporated into the front rod rest top and hence have a dual function. An antenna acts as a lever, converting a small pressure at the tip into a larger pressure between the contacts. The importance of contact pressure has already been explained (Hawkins. Bull. 6.4. Dec.1969), and it is largely through this factor that the antenna derives its sensitivity, which can be far greater than that of the 'carpcatcher'type. Basically an antenna is a stiff vertical rod free at the upper end and pivoted on spring mountings at the other. The size of the leverage effect is given by the ratio of H1 to H2 in fig.3, below. The greater this ratio, the more sensitive the system potentially becomes, and therefore should be born in mind when designing this type of bite-detector. There are two ways to increase this ratio. We can elongate the antenna, or shift the position of the contacts further down it, or both. There are limits to this, of course. Firstly, the antenna length is largely determined by the strength of the spring to be used with it, obviously a long antenna with a weak spring results in a very sloppy instrument only useful in very calm conditions. Secondly we can only increase the ratio between tip and contact pressure at the expense of having to move the tip further and further to close the contacts. Eventually also, the distance between the contacts, even when fully open, becomes so small that shorting across may occur. Finally, the problem of inertia begins to rear its ugly head. Without going into details, this means the force required to get a particular object moving, irrespective of what is required to keep it going once it has started. This depends on the weight (strictly speaking, the mass) of the object, and therefore we must keep the antenna as light as

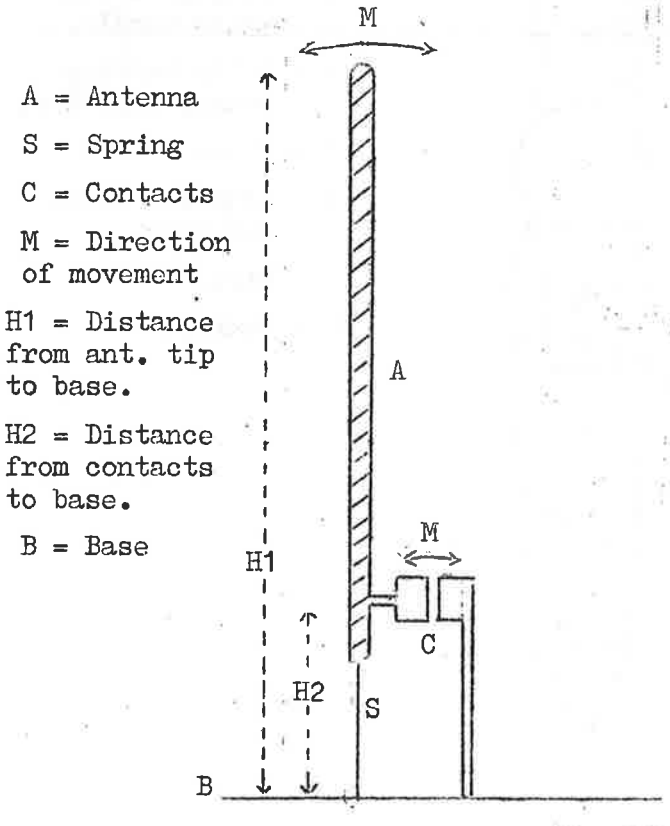


Fig.3. Principles of Antenna Operation.

possible to achieve maximum sensitivity. To avoid confusion, it may be as well to define what we mean by the word 'sensitivity' in this context. Simply stated, it is the minimum amount of force that must be applied (from a pull on the line) to close the contacts and sound off the alarm. As far as the eel is concerned this force is simply resistance it has to pull against, and therefore it is in our interest to keep it as low as possible.

Having said all this, let us look at the various ways antennas have been used up to now. Firstly there is the commercial model,-the 'Heron'-which I believe is sufficiently familiar not to warrant much description here. As a complete article, there seem to be two things wrong with it. One of these is the fact that the antenna emerges from a hole in the top of the box in which it is mounted, thus allowing water to run in and short across the contacts. This leads to the curse of false bites in the pouring rain; one is lured out from one's brolly at the very time when it is most desirable to stay inside! Brian Knott has come up with a solution to this, and the following is lifted wholesale from his article on the subject.

The diagrams below will illustrate and clarify the various points raised in the following article on bite-indicators (fig.4.)

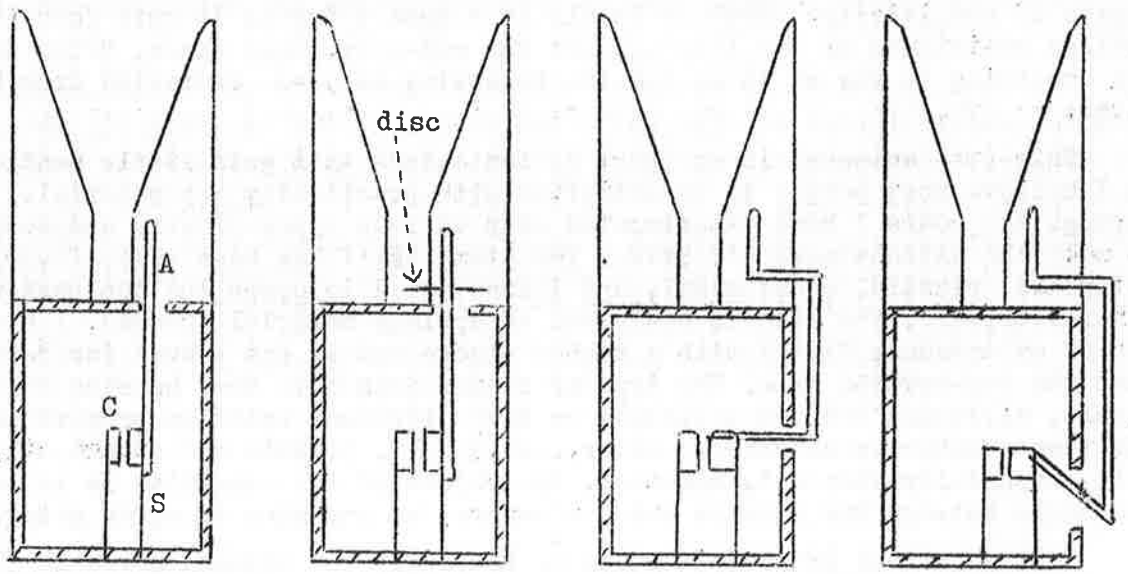


Fig.4. Modifications of 'Heron' indicator.

(Lettering as fig.3)

The most popular version is (a), usually known by the trade name of 'Heron'. The disadvantage of this type is that it is easily affected by damp, meaning rain and mist. It is understandable as the antenna's access hole is directly on top of its container making the entry of the damp quite easy. The simplest cure for this complaint is the idea shown in diagram (b). A thin disc of silver paper is pierced by the antenna and pushed down to cover the hole. Even this method is not fool-proof, as the damp appears to create a bond bet between the disc and the antenna case causing a loss of sensitivity of the instrument. I have, over the past season, adopted the design in diagram (c), completely re-designing the antenna case to accept these modifications. As will be seen the antenna now makes it's entry from the side. This I feel has solved my problems with damp, but as an afterthought, the antenna itself could be re-designed a stage further. This has been illustrated in diagram (d). This should allow the accumulating damp to run down to the elbow and drop off, instead of penetrating the case and causing corrosion of the contacts.

These modifications are based on my own experiences, but I feel sure that there is plenty of scope for more modifications and improvements. Some previous articles have raised the point of decreasing the contact area size, and also using non-corrosive metal, gold, platinum etc. The ultimate solution to this problem, of course, is to go fishing in dry weather only.....

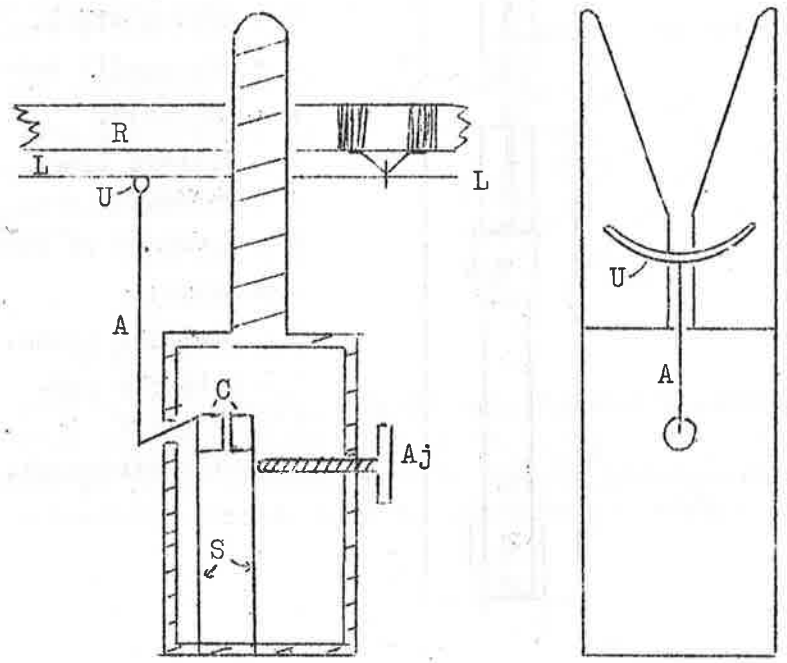
Thank you, Brian. I hope, however, that you were not too serious with your last comment. Part of the purpose of this piece is to sort out an all-weather device, and in fact the Bowyer/Hawkins gadget, to be described later, will survive a thunderstorm without trouble. One can in fact tip a bucket of water over it without wetting the contacts. Returning to the 'Heron', the second defect of this type is the fact that the antenna moves at right angles to the direction of pull on the line, rather than in the same direction. In other words it responds to the tendancy of the line to straighten out when it moves foreward, and not directly to the force of the fish on the other end. In that this depends to a considerable extent on the suppleness of the line, and on the resistance to line movement from the reel behind, it is in my experience a rather inefficient and unreliable instrument. The greater the friction between antenna and line, the more nearly equal are the foreward pull on the line and the sideways force on the antenna. Therefore we should aim to make this friction as high as we can. Also, the higher the friction, the less we have to offset the antenna from the centre to achieve a given degree of sensitivity, which in itself is a good thing as it cuts down the useless resistance of the line against the rod-rest. Once again, Brian Knott has something to say on this, and the following is also extracted from his piece.

This (the antenna) is one part of indicators that gets little mention, so I believe most people to be satisfied with practically any material. Through the years I have experimented with various types of wire and coverings to make the antenna more effective. The stem itself has been made of various materials, plastic, wood, metal, and I have tried to cover the top part with other materials. The stem is best made of springy material (round). I have one of my antennas fitted with a rubber sleeve and it has proved far better than the non-covered type. The type of rubber does have some bearing on the result, siliconed and non siliconed do have different friction properties. (silicon -rubber is considered later,..ed.) Felt, plastic and sponge etc, just slip, especially when wet. Remember, the object of the excercise is to reduce the angle between the antenna and rod centre, so anything is worth a try.

On theoretical grounds it would be better if the antenna moved in the same direction as the line, and two bite-detectors which work in this way are known to the editor. In that the design of these involves modifications of the antenna itself it would be as well to look at them now; returning later to consider the methods of construction of all three at the same time; as apart from the differences of the antennas, they can all be put together in much the same way.

For information on the first of these we are indebted to Rian Tingay for his excellent drawings and acount of the mechanism, although the idea was originally dreamed up by Arthur Sutton. The antenna is mounted in front of, and in line with, the centre of the rod-rest top, and a U shaped piece of material is mounted on the tip (see fig.5. opposite-U). This U shaped piece is covered with a material which has a high frictional 'grip' on nylon monofil. (Rian Tingay tells me it is silicon-rubber; but Geoff Swailes, who works in the plastics industry, informs me that the chief feature of this substance is its extreme slipperiness, and has doubts whether this can be so. Geoff is looking into this problem, and hopes to find a suitable material shortly). With the rod in the rest, the line lays on this piece of rubber. When the line is pulled, the rubber grips it sufficiently to drag the antenna foreward, closing the contacts and thus sounding the alarm. We are informed that what usually happens is that the antenna jerks foreward and slips back repeatedly during the run, giving a succesion of short 'bleeps' on the buzzer. This may happen, and would be very desirable if it did, but having had no

personal experience of this model, I cannot comment. As will be seen from fig. 5. below, the design incorporates an adjuster screw to alter the gap between the contacts. It will be appreciated, however, that the range of adjustment of this type of detector must of necessity be rather small, as we are strictly limited to the amount of grip we can obtain between rubber and line. This type must therefore be viewed as especially suited for still water fishing, for which, according to Rian, "it can be set so fine that one can not pull a piece of sewing thread across it without sounding the alarm." It is difficult to see how this sensor could be set to cope with a current when river fishing, unless one further elaborated the gadget in a new way. The essential features of this detector are shown in the diagram below.



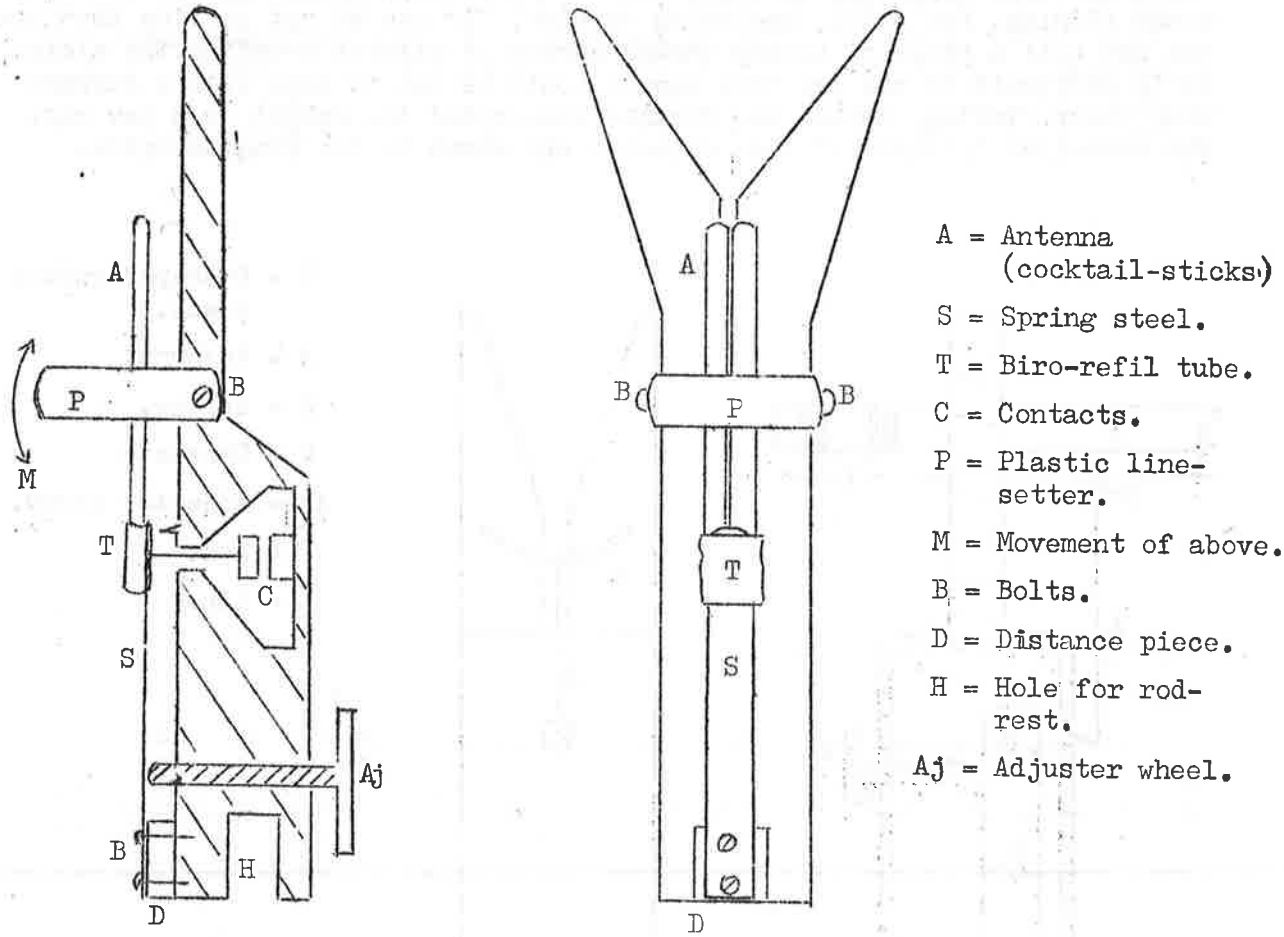
U = U-shaped rubber piece.
A = Antenna.
S = Spring.
C = Contacts
Aj = Adjuster screw.
R = Rod.
L = Line.

Side view Front view

Fig.5. 'Arthur Sutton' type indicator.

The other type of 'in line' indicator is that devised by a concerted effort from Chris. Bowyer and the Editor. As before the antenna sits upright in front of, and in line with, the centre of the rod rest. In this case, it is a double structure, being made of two plastic cocktail-sticks held together at the base by a piece of biro refil tube. With the rod in the rest, the line is pushed down between these sticks, which grip the line sufficiently to pull the antenna foreward when a run occurs. As will be appreciated, the further one pushes the line down between the sticks, the tighter it is gripped, and because the leverage effect on the spring is reduced, the harder it is to pull the antenna foreward. Thus there is a built-in adjuster mechanism.To extend the range of this adjustment, however, an adjuster screw is incorporated (see fig.6,overleaf). This allows one to utilise the considerable grip obtained by pushing the line down nearly to the base, as a sensor capable of holding the line against any current likely to be encountered in normal fishing. At the other end of the scale, the editor has successfully caught roach on two pound line using ledgered maggot, with the same detector set at its maximum sensitivity. The details of this detector are given in fig.6 overleaf. Just as it is, however, this system has one fault. As the line runs out so it tends to work its way further and further down between the

two sticks, and thus the resistance becomes greater and greater. To overcome this, a piece of polythene (cut from an old detergent bottle) has been fitted, which can be swung up and down in front of the antenna to set the distance to which the line can fall (see diagram P).



Side view. Front view.

Fig.6. 'Bowyer/Hawkins' type indicator.

It has been discovered that this plastic loop allows us to use the sensor in a new way. If one pushes the line in, and then raises this piece of polythene right up behind it (see fig.7, below), then when a run occurs the line jerks the antenna foreward to give a bleep on the buzzer, and immediately jumps clear of the antenna sticks altogether.

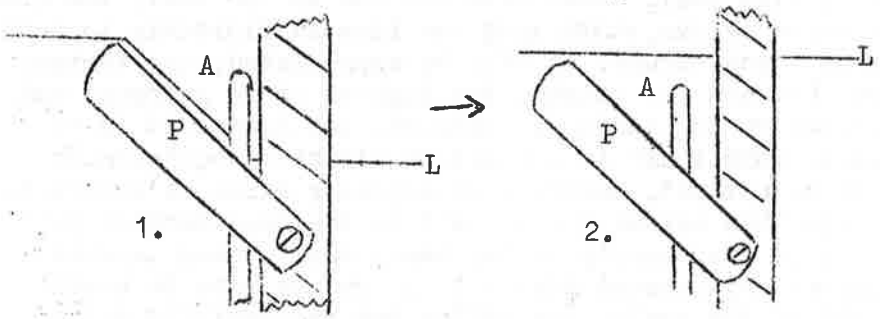


Fig.7. 'Free-line' use of 'Bowyer/Hawkins' type.

Thus, if one is awake enough to register a buzz of a few seconds only, we have a system which releases the line like the carpcatcher type without flattening

the battery as this model is liable to do.

Having examined three ways in which the antenna has been put to use, it now remains to tidy up the few details which have been omitted from the descriptions so far. Probably the simplest way to construct an antenna system is to start with a small box; preferably plastic-as one has no problems of insulating the contacts with this material; and fitting the various bits and pieces into it. A rod-rest-top is fitted to one end of the box, and a socket for a bank stick to the other. The contacts are situated inside this case, and the antenna mounted directly onto one of them, to emerge from a hole in the side of the box. A suitable method for making these contacts has already been described (Hawkins, Bull. 6,4. Dec,1969). Such adjuster screws as are required are tapped directly through the sides of the case. (It should be mentioned here that adjuster screws have, for the sake of simplicity, been left out of the diagrams of the 'Heron' type).

An alternative method of construction is illustrated for the third type of indicator, although this 'Hawkins/Bowyer' model could equally well be made almost exactly like the 'Sutton' type. The object of changing the design was to make the device as small and as light as possible. (Fig.6 is approx.1½ times life-size). Instead of a box, sheet perspex was used, several pieces being bonded together with 'Araldite' to increase the thickness where necessary. The antenna and spring run in a straight line down the front of the gadget;-the spring being cut from a stainless-steel razor blade. This gives a very light-weight antenna system with corresponding high sensitivity. The contacts are housed in a funnel shaped hole in the body of the instrument, one being fixed rigidly to the back of this hole, and the othe being attached to the antenna by a short length of stiff wire. Space does not permit a full description of the construction of this sensor here; thanks, however to the efforts of Chris.Bowyer a full scale set of plans for this model are available from the editor, together with a full written description. Anyone interested should contact me for a copy of these plans. It is regretted that a small charge of two shillings will have to be made per set to cover the cost of duplication.

Before leaving the antenna type of indicator, it would be as well to try and list the advantages and disadvantages of the three types under discussion, as a basis for choosing the model one may construct. This is done in the table below. It should be pointed out, however, that this is largely a personal assesment, and possibly therefore open to question. I am reasonably satisfied even so that the relatively high score of the Bowyer/ Hawkins type is not solely due to personal bias on the part of the editor!

	'Heron'.	'Sutton'.	'Bowyer/Hawkins'.
Convenience in use.....	Fair	.....Good	.....Fair.
Adaptability (ie range of current,wind etc conditions that can be handled).	Fair	.....Poor	.....Good.
Absolute sensitivity..... (or line-resistance).	Fair	.....Good	.....Good.
Water resistance (rain, fog etc).	Poor (unless modified)	.....Good	.....Good.
Reliability.	Fair	.....Good	.....Good.

Finally, a very brief word about the rest of the apparatus. It has been suggested that one can run two detectors on the same buzzer, with a seperate light for each. This, unfortunately is simply not possible if one wants to arrange buzzer and lights in parallel (as one must).

To finish, let me wish you all the best of luck in your gadget making, so that you can, quite literally, rest easy in your beds.

electa mechan...

A CAUTIONARY TALE.

by Alan Hawkins.

Word has reached me of a small elite who actually catch fish on their first trip of the season. They are not, presumably, harried by the malicious set of fates, which having stored their spite all winter, burst forth in concert on my first venture. I take some consolation from the knowledge that others occasionally experience opening trips which fall short of expectations, regarding myself as something of a champion to this band of unfortunates. After all, it doesn't matter what you do as long as you do it well. What I do very well indeed is to turn the first serious attempt to catch eels into a scene reminiscent of silent films of the Chaplin era. Except, of course, that this trip does not tend to be silent, there is a strong vocal accompaniment rich in words rarely found in the standard dictionaries. Even so, an early trip last year reached such a pinnacle of farce that I doubt whether I shall ever be able to scale such heights of acheivement again. It seems appropriate now to try and recall the events of this occasion, as amusement for those who do succeedon their first trip this year, and consolation for those who do not.

The scene was Tockwith Farm Pond; a beautiful little water set in a sea of mud. Thick, vicious, mud, of which the farmer (not the brightest of men), is rather proud. Proud enough to welcome it into his house and half way up the walls, at any rate. He is fond of relating tales of how his cows get stuck and how he has to get a tractor to pull them out, and cart-horses to extricate the tractor,and so on:-until one would be excused for thinking half Yorkshire was attached to a rope leading to a victim of the Tockwith morass. Forgive me for sounding a little bitter, but he is filling it in, and strangely enough I still rather like the water. I am not, in any case, nearly so bitter as a friend of mine who has been banned from fishing there altogether. He was foolish enough to spin sprats for pike, and flung off for killing the little fish for bait. It was of no avail to try and explain that on the whole, sprats tended to come from the sea rather than fresh-water.

But I digress. On a wet evening last Spring the author arrived with all the vast accumulation of gear he had been preparing all winter, and, having forgotten about the depths of mud, tried to cart it all round in one go. Thus it was that a walk of little more than two-hundred yards took nearly an hour to accomplish, with the angler being transformed into the enraged slimy creature of the 'bug-eyed-monster' type of horror film. Eventually a small mound of higher ground was attained, from which the author elected to fish. The vast 'brolly was erected and the polythene surround set up with due regard to the direction of the wind. Inside was placed the specially modified bed-chair, spare tackle, spare clothes, stove and sundry strange electrical devices to record whatever the angler felt like recording. In front, three mighty rods were set out in due majesty, equipped with the very latest in electric bite-detectors.

At this point, two young lads arrived, with a small and meagre assortment of tackle. They came and gazed in awe at the gear of the expert, and said that they had come for the first time ever to try to catch eels at night. The pundit conducted them around his dwelling in the lofty manner of a lord showing half-a-crown visitors round his stately home. After many words of wisdom had been imparted, the lads crept away to the far side of the pond where they almost shamefacedly put together their rods.

It was now getting dark, and almost at once a commotion on the far bank informed the expert that the first eel of the night was being landed. He hunched foreward on his bed-chair, in anticipation of the run which must surely come soon. And so he sat until midnight, with not a bleep, until his sombre broodings were interrupted by the reappearence of the two novices.

"Can we", they said, "borrow some wire?,as the big eels keep biting through our line."

It was soon apparent that the borrowed wire was doing well, and by 01.00 hours the expert was uncomfortably aware that at least two eels of more than two pounds had been landed from the other side of the pond. The pundit was unhappy. The lads were using lobs, but so was he on two of his three rods. Further, the worms of the novices were tiny, shrivelled,creatures compared with the fat and juicy specimens of the expert, (as, it must be confessed, he had been at pains to point out some time ago).

Then a frantic buzzing informed all that the expert at last had a run. With great joy it was found to be on the dead-bait rod, and line was still peeling off on the first mad rush by the time the lads came round to watch. While waiting for the fish to swallow the bait, the pundit took the oportunity to explain how eels tended to run bigger on dead-bait than on worm. So well did he tell the story that when he eventually came to strike the tense anticipation on the faces of the novices was a sight to behold. He struck. He reeled in in half a minute flat. It weighed 1lb. 2oz.

The lads retired to catch the fish that had obligingly taken their baits whilst they had been away.

Half an hour later, it began to rain heavily, and the wind changed direction to blow directly into the entrance of the expert's 'brolly.' Muttering strange oaths, the pundit pushed his bed-chair into the far corner of his shelter, and then found he had a problem. Stuck right at the back, the chair was impossible to get on without taking a leap at it. He leaped. The bed collapsed. A despairing grab at the 'brolly'and this came down too, enshrouding the expert in a tomb of slimy wet polythene, canvas and umbrella ribs.

Hearing the commotion, the lads thought he had a monster eel, and came to look.

They must have thought it strange, this lurching, heaving, mass of gear, dimly visible in the gloom, which was slowly rolling down the slope to the water. Strange enough for them to be frightened of interfering as the mound came up against all three of the rods, and, like a giant amoeba, engulfed them all into its flailing mass. Stranger though, must have been the sight of the angler who finally emerged, and who, having lost all sense of direction, like Neptune stepped into the water instead of onto the land.

It was not until dawn that the expert had re-established himself, and was once more pondering the failure of his worms. Eventually, he could stand it no longer, and crept round to the novices and stole a few of their's. Five minutes after casting out with the new bait he had a run, and in the clear light of the early morning missed it completely;-to the utter astonishment of the two lads who had not lost a bite all night.

It was this final trauma which jolted the expert into a realization of what was wrong. He had filled his worm tin with earth from the very spot in the garden that his two cats always used as a lavatory.

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GROWTH RATE STUDY-THE PRESENT STATE.

by Geoffrey Swailes.

Summary.

The article describes the formation of our otolith reading panel and gives background information on the need for a study of growth rate. The objects of the study are described and some indication of its potential usefulness is given. Stock lists for 1968 and 1969 are also included.

Introduction.

The NAC's interest in growth rate stems from the 1966/67 period when otolith reading was undertaken for the Club by Dr. Sinha of Liverpool University. These results were published in the 1967 report which covered four waters,- Lake Helen, Stickney, Butler's and the G.U. canal. We were indeed fortunate that Dr. Sinha spared such time as he did on our behalf, as his work served two purposes;-these being (1), the demonstration of the usefulness of growth rate work, and (2), the aquisition by the Club of a stock of pre-judged otoliths which future NAC members could read to check their estimations with thòse of an acknowledged expert. Since that time we have been on our own, and relatively inactive.

Formation and Working of the NAC Otolith Reading Panel.

Last autumn Alan Hawkins and myself made a start on learning the technique of otolith reading. We worked on those stones previously read by Dr. Sinha and the degree of correlation obtained was sometimes good, mostly fair, and on some occasions wretched. On the whole, however, the overall result was thought to be acceptable, ie. we were reading what we were supposed to read, and so a panel of three readers was set up and a definate programme for future work established. Briefly, this is as follows.

(1). Otoliths collected during the season's fishing will be sent direct to me. I will hold the stock, distribute stock lists and organise the reading of the stones by the panel according to agreed priorities.

(2). When the readings are complete, the results will be sent to Terry Coulson for analysis and reporting.

This may seem a lot of work;-it is, but believe me 80% of our time will be spent huddled over our microscopes reading the damned things. This is where the force of Alan's contribution is going to be felt. It is recognised that this study will be a big job if it is to be tackled properly,(and it is);- for instance I estimate that each otolith will recieve an average $\frac{3}{4}$ man-hours of work from collecting to reporting. In this case one could well ask "why take it on in the first place?". To answer this let us take a look at the background.

Background.

The Bulletins from Nov.'66 to Mar.'67 contained five articles by Terry Coulson in which he explained the need to approach the problem, that of catching big eels, in a scientific manner. I think that a reference to his work is the best way of showing how a study of growth rate fits into our present data collecting scheme.

In these articles Terry describes his basic thinking thet led to the organisation of the above scheme. His main theme was "location" and how to set about it, taking the line that information is available from several sources, and that those who care to collect it, analyse it and interpret it will then reap their own rewards. These sources of information,and the facts obtainable from them are described in table 1,(opposite). The five articles are listed in table 2,(opposite). I shall not attempt to summarise them in detail, but instead I will recommend them for study by newer members,or some of our older comrades who have dim memories or dusty libraries.

The source of information that concerns us most, (although the others are by no means irrelevant), is our own reporting scheme. This is designed to give us two main facts;-

1. The size of eel we can expect from a water, ie LOCATION.
2. The chances of catching an eel from that water, ie PROBABILITY.

TABLE 1.

Information: Sources and Uses.

Source	Facts	Use
1. Scientific Literature.	Basic information on zoological and botanical matters. Includes growth rate and weight studies.	Provides concrete information for us to use as a basis for our more angling-orientated work.
2. Outside sources. a) Clubs and Groups. b) Press reports. c) Local Knowledge.	Location of big eel capture, baits used, tackle, tactics, etc.	Draws our attention to possible location and methods.
3. Our own scheme.	Weight - Range and median values. Length - Condition coeff. Growth rate. Effect on RH/E of a) Location. b) Temperature. c) Cloud. d) Bait etc.	To asses probable eel sizes in our water. Compare with Grand-Average Gives the chances of success on our waters.

Table 2.

Articles in Bulletins, Nov.'66 - Mar.'67.

November.	Introduction. Sources of information are given, and the advantages of the scientific approach are discussed.
December.	Growth Rate. An assesment of the amount of work involved is given together with important statistical considerations. Previous scientific work is described.
January.	Weight and Numbers. The uses of averages and frequencies in rating water potential are described.
February.	Weight and Length. The significance of condition coefficient is discussed.
March.	Time Dependant Factors. Rate of Catch, Seasonal variation etc are discussed.

Growth rate is concerned with fact number one. We are now familiar with the use of weight and condition coefficients to assess the likelyhood of a water holding a 'lumper'. Bulletins reporting on the 1966-'69 seasons contain such facts in abundance. Apart, however, from the 1967 report, information on growth rate has been sparse. The zoological literature does give some information, and this is described in the Bulletin of Dec.'66.

So far, then, so good; as regards the actual operation of the scheme I shall refer member's attention to the "Guide to the 1968 reporting schemes". The procedural matters are out of date now although Terry has promised to revise them in the new edition, but the basic scheme is, however, sound. In essence it is that growth rates should be measured on project waters, from which attempts will be made to obtain a sufficient number of otoliths to enable a reasonable estimate of growth rate to be made.

Objects of the exercise.

Although in reality part of a single plan, it is convenient to split the aims of this project into four headings, of which the first three to be considered are most relevant to the NAC.

1) Growth rate can be used to supplement the present system of assessing the potential of a water by weight and condition alone. Let us take as an example two waters, X and Y, and suppose the data on them was as follows:-

Water	X	Y
Median Wt.	2:0	4:0
L.Q.	1:0	3:0
U.Q.	3:0	5:0.

One may assume that water Y holds better prospects of a 'lumper' than water X. OK, but, now let us suppose that a growth rate study of the two waters revealed the following:-

	Mean age in years	
Water	X	Y
Weight		
1:0	6	12
2:0	7	14
3:0	8	16
4:0	9	18
5:0	10	20

Given the additional information that, due to migration, we catch very few eels over twenty years of age, which water would you chose for your monstrous beasty?

2) We can derive a grand average graph of weight versus age and also compile graphs for individual waters. This will enable members to determine the potential of a water quickly by snatching out a dozen or so of the smaller eels, determining their ages and comparing them with our standard graphs. The important point to remember here is that rapid growth in the early years is vital to the attainment of 'lumper' proportions. To illustrate this point consider the three hypothetical plots in fig.1 (opposite). A and C represent what I think are the extremes of growth rate in Britain. B could be taken as a grand average. PLEASE REMEMBER THAT THESE ARE HYPOTHETICAL PLOTS. The dotted line, D, I do not believe a possibility. Now if the age/weight points from your dozen bootlaces fall approximately along plot A, then as likely as not you are wasting your time, mate! However, if the dozen points fall between plots B and C, then you're onto a good thing, as long as conditions exist for rapid growth beyond the point of inflection, (ie the point where the curve makes a rapid upwards turn,..ed).

3) A long-term project, but probably the most important is that growth rate will assist in the compilation of dossiers on individual waters. These would contain a water survey as described in the "Guide" 1968, section 3.8, ie a

description of the location and the physical and ecological features would be given, together with analytical results of session reports and growth rate studies.

4) The reults could be published in the scientific and angling press, for useful prestige and possibly funds for the Club. With careful management, this need not involve us losing the confidential nature of information on the waters we fish.

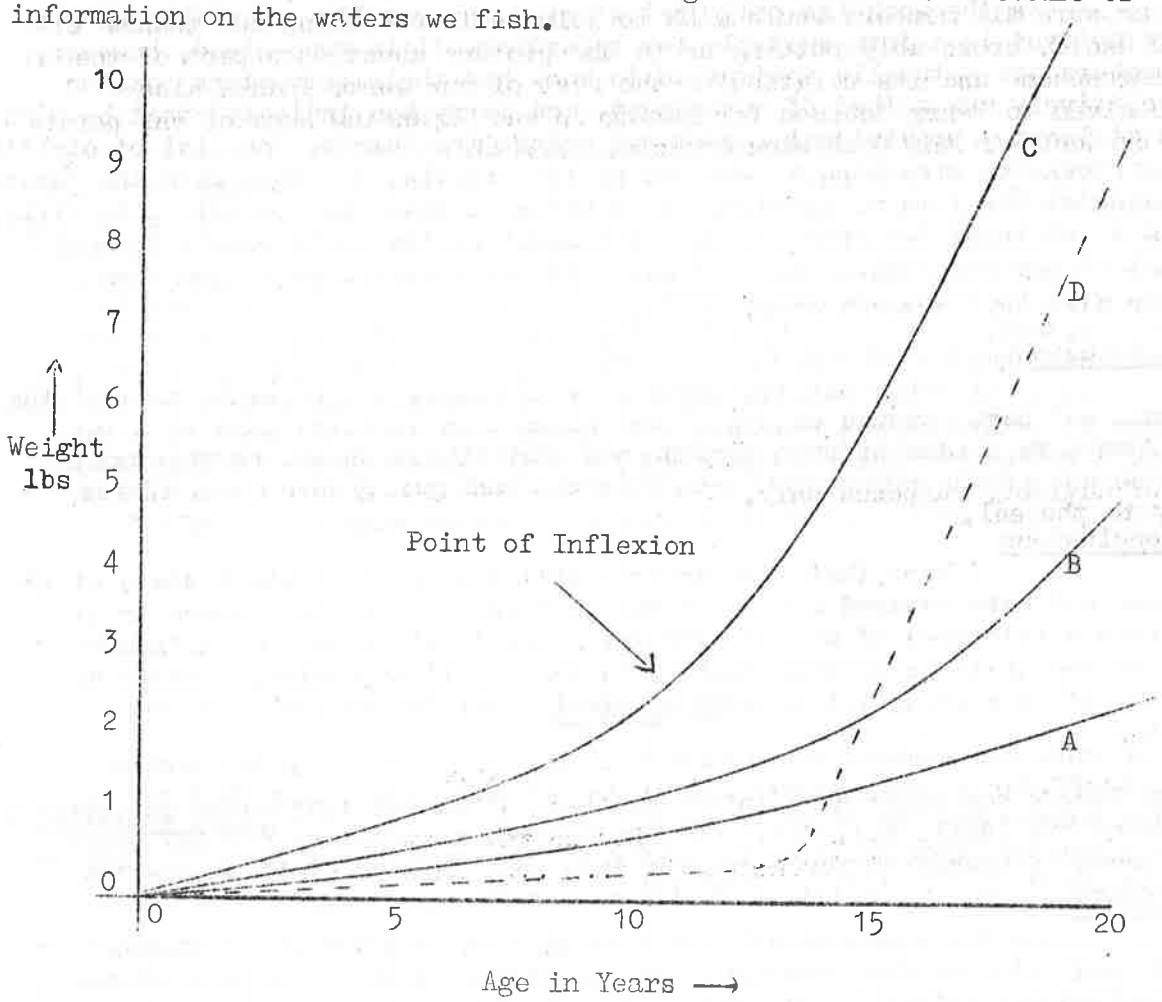

Fig.1. Hypothetical Growth Rates Graph.

A point that should be mentioned here is that if a growth-rate study of a water is going to yield meaningful results then a large number of otoliths will have to be obtained, and from a representative selection of eels, ie. not all high or low weights. We do not know exactly how many, yet; the answer depends on many factors upon which I do not feel qualified to comment. Suffice it to say that it is a number which gives a wt.v.age plot that is not substantially altered by the addition of further sample data. I would suspect that at least 30 otoliths are required to give a tolerable degree of certainty. This, however, need not deter us from drawing inferences from smaller numbers of stones, as long as we realise that there is an element of uncertainty in the results. The plain fact is that we do not yet know how the degree of error varies with the number of otoliths examined, or even what degree of uncertainty we can tolerate when drawing conclusions from our readings. To illustrate this point I pose the question;-" If we can attain, say 70% certainty (ie, we are right 7 times out of 10) with x units of effort, is it worthwhile to expend 10x units of effort for 80% certainty, or even 100x units to get 90%?." These questions will obviously be borne in mind and discussed as the work progresses through the next few months.

Results

As the work has only just started the results are rather meagre and are not yet in a form suitable for reporting. It is recognised, however, that members are naturally anxious to to know how their pet waters rate on this relatively new method of assessment, and Terry has indicated that he aims to get at least a provisional report out before the Summer. The list of otoliths held in stock are presented at the end of the article, together with the 'state of reading'at the time of writing. It is intended that each otolith pair will be read by at least two members, and preferably by the whole panel. This will ensure that any one reader does not drift his estimates high or low with time. As will be seen, the stock contains 355 otoliths collected from 30 different waters. Only 7 of these waters, from which 244 otolith sets have been collected justify a full scale analytical treatment, although these can be augmented by the 1967 results which will add another two waters to the list. The other 23 waters as yet have not had enough otoliths collected from them to allow a reasonable curve to be drawn, and the readings from these can be used for advisory purposes only.

Conclusions

I hope that this article will convey the present state of the programme and have covered enough of the background to allow members to at least form a fair idea of what growth-rate work is all about. As this must surely be one of the principle factors in the location problem, I would be delighted if this piece led to much debate in forthcoming issues of the Bulletin.

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I am sure all members would wish to join me in extending our thanks here to Geoff.for so ably putting us in the picture about this part of the reporting scheme and its relation to the rest of our work. Thanks also must be given to Terry Coulson for taking up and expanding some of the points raised by Geoff in the following article.....(ed.)

EEL WEAL.

A gem from the Press extracted by Arthur Smith.

A fisherman in Gothenburg, Sweden, was recently taken to court after he had spanked his wife with a live eel. He was found guilty and fined £2-for cruelty to the eel.

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BRIEF NOTE.

Rod Storey has written to inform us that, since publication of his article on a rod of his (Bull. 6,4. Dec. '69), he has had a quotation for the price from Olivers of Knebworth for supplying this rod. This is £7-19-0 plus 7/6 for carriage.

OTOLITH STOCK LIST.

Water.	1968		Read by.			1969		Read by.		
	Code	No.	GS	TC	AH	Code	No.	GS	TC	AH
Adcocks Pond.	AP	3	+							
Balderton Pit.	BP	8								
Balderton Pit (West).	BPW	9								
Benniworth Haven Low Pond.	BHL	6	+							
Bottomless Pit. Lancs.	BL	5	+			BL	4	+		
Butlers Pit.	B	42	+	+	+					
Castle Howard.						CH	47	+		+
Chandlers Ford Lake.						CFL	2	+		
Cowick.						CO	8			+
Cartwright Pit.	CP	4	+							
Crowle Brick Pit.						CBP	3			+
Crown Pit. Big.	CB	6	+							
Crown Pit. Small.	CS	4	+							
Ditchford Lake.						DL	2	+		
Dringhouses Lake.						DR	5			+
Exeter Canal.	EC	1	+							
Fenhouses.	F.	4	+							
Grand Union Canal.	GUC	3	+		+	GUC	9	+		
Greystone Lake.	GL	3	+			GL	4	+		
Kingsmead Pit.	KP	3	+			KP	4	+		
Knutford Lagoon.	KL	2			+					
Lake Helen.	LH	1	+							
London Road Pit.	LRP	5	+							
R. Gt. Ouse, Bucks/Beds.						ROB	26	+		+
R. Gt. Ouse, Cambs	ROC	22		+	+	ROC	22	+		+
R. Gt. Ouse, Littleport.						ROC1	21			
Sandbeck Park Lake.						SA	19			+
Slingfold Lake.	SL	3	+							
Stickney Pit.	ST	7	+		+					
Tockwith Farm Pond.						TFP	8			+
Roswell Pit.	RP	33								

GROWTH RATE STUDIES.

by Terence Coulson.

Geoff. Swailes' interesting piece on growth rate, which I have had an oportunity to read before publication, provides an opportunity for me to add a few comments of my own. The first word of comment must be a word of thanks to Geoff for taking the initiative in this way to revive members' interest in this part of our reporting scheme. When I first outlined the whole scheme in the Bulletins during the Winter of 1966/7, I wrote in connection with the study of growth rates that "it is a very big job, and we may find in the end that (it) is very much less useful than we expected", but I went on to add that "my own conviction is, simply, that we cannot afford not to take it on."

My views have not changed in the meantime, and I still believe that growth rate investigations are something we cannot afford to miss out. Indeed, if I had known in 1966, when I proposed that the Club should form its own otolith reading panel and invited members to volunteer for this work, that virtually four years would elapse before we got anything off the ground, I should have been somewhat discouraged, to say the least!

However, the readings which Dr. Sinha did for us in 1967 not only provided a start to our collection of growth rate information, but they also gave me the means to run a training scheme for any volunteers who might come foreward. In the intervening two years, the Club scheme has included otolith collection as an optional project, resulting in a very useful stock which Geoff has catalogued in his article, all ready for a panel of readers to sink their teeth into.

So, when two volunteers in the persons of Geoff. and Alan Hawkins, finally accepted my invitation to join me in this work, our panel at last came into being-a small panel of only three members, it is true, but a panel nevertheless. Incidentally, it used to be thought in mediaeval times that three was a magic number; but the number seven was even more powerful magic. The moral of this is that although otolith reading is interesting it is fairly time consuming; and if we are to get through the volume of work that is needed without it becoming too burdensome, a larger panel would be an asset. In fact, members might like to know that Alan Butterworth is considering joining, and is working his way through the first set of training otoliths, and that Brian Crawford hopes to be able to take part a little later on when the pressure of his studies eases. In the meantime, any member who feels he might be able to make a contribution to this exercise is cordially invited to get in touch with me.

The first thing that any otolith reading panel must do is to standardise: that is, to work together until its members are producing age estimates which are self-consistent amongst the various members, and reasonably in line with reliable readings produced by an expert reader. The first point is fairly obvious; if the work is to be shared out in a labour-saving manner, the estimates produced by all the members of the panel must be comparable, otherwise consistent results would only be obtained if all the members of the panel read all the stones- an undesirable limitation! The second point is possibly less obvious; indeed, I have seen it suggested that getting the right answer is of no consequence providing the errors are consistent. This is quite a wrong-headed approach and it is worth spending a moment to indicate why.

There are three main reasons. Firstly it is very desirable (I am inclined to say essential) that growth rate information should not be considered in isolation, but should be correlated with other sources of information about the waters (eg the median and quartiles of the catch, the rates-of-catch, etc) and it would be foolhardy to attempt such correlations unless one is sure that there are sixteen ounces to the pound in all the data.

Secondly, errors can be "consistent" without being the same throughout the age range, and since we shall often be interested in projecting the likely size of older eels from readings on the younger ones, this will not do. For example, one of my personal weaknesses as an otolith reader is a tendancy to read low with the youngest and oldest eels, and high with the intermediate ones; I think I have now corrected this fault-I certainly hope so, otherwise my projections will be optomistic with a sample of young or old eels, but pessimistic with eels of medium ages. Projections made on such a basis would obviously not be comparable one with another.

Thirdly, it is most important that our readings should be acceptable to other workers, and theirs to us; so that we can benefit from other people's work, and they from ours. One aspect among several is that we might eventually wish to publish some selected results in the scientific journals; this could be of incalculable benefit to the Club, but cannot even be contemplated unless we are sure that our results are scientifically valid.

In short, it is vital to get the growth rates not merely in the right comparative order, but also of the right magnitude, too. Geoff. is a little more sanguine about this than I am, when he writes that the results of the present panel's training programme were "acceptable"; in fact we all three produced results which were somewhat different from Dr. Sinha's. For this reason, I have proposed a procedure which makes the panel's first priority the reading of fresh stones from the four waters covered by the "Report on the 1967 Growth Rate Work". If the panel's results marry up with and satisfactorily extend Dr. Sinha's results, we shall know that our work is valid and can safely proceed with new waters. Incidentally, Dr. Jones has kindly arranged for the collection of 30-odd otoliths I collected from Abberton Resevoir eels to be specially read for us, and hopefully these will provide an additional training set suitable for a "passing out test" for panel members.

Looking ahead, now, to the time when more and more growth rate information starts becoming available to us from the panel's efforts, all being well, what guide lines can be laid down for its use and interpretation? Why did I write in 1967 that it may be "very much less useful than we expected"? Many of the reasons for this are set out in my original piece in the Bulletin for December, 1966, but it will do no harm to review the matter here.

The first point I want to make is that we do not know in terms of fact <u>how</u> growth rates may be related to angling prospects. It is tempting to assume simply that good growth rates mean good prospects and poor growth rates mean poor prospects; but a moment's reflection should show that this superficial view is oversimplified (to say the least!). Of course, it is likely that really poor growth rates will indicate that there just are no big eels in the water. However, it would be unwise to assume that even this apparently obvious conclusion is certain. For example, might it be possible, in a water where growth is limited by the availability of food, that a proportion of the eels turn cannibal and thereafter enjoy rich feeding on the annual influx of elvers, and their smaller brethren, and wax fat? To put the point a bit more scientifically, we do not know how poor growth rate may be related with the distribution of sizes around the average, and this is something we shall have to learn about as our growth rate information accumulates.

But what about cases where an initial sample of small eels indicates a good growth rate? Does this necessarily mean good prospects for big eels? The answer to this question must be "not necessarily!" For the prospects of catching big eels to be good, there must be a good supply of big eels actually there, in the water, to be caught. Obviously, if one thinks about it, it is entirely possible for a water to contain plenty of fast growing little eels without there being any big eels there, at all. This might happen, for example, in a fairly recently created water, or one which has

only recently become open to an influx of elvers, or in one which for any reason recieves an influx of elvers only on relatively rare occasions. Again, it is conceivable that fast growth might be associated with migration at abnormally early ages before the eels have realised the apparent promise of their good early growth. Indeed, there is evidence that just this situatiion occurs in cases where the good growth is due to relatively high water temperatures.

Please note that I do not say that any of these things are so: I merely say that they are conceivable- and it is not a bit of good discussing or arguing about them! They are questions of fact, and the only way to arrive at answers is to do the work and find out. The point I am making, and want to emphasise, is that members would be wise to guard against drawing superficial inferences from growth rate information until we know a good deal more about it. The truth is that we are entering an area of real "angling research", and it is this light that we should regard the results we accumulate, and the way we treat them.

The second point I want to make follows closely from the above. I remarked that good prospects for big eels require a good supply of big eels for the catching. Now, one may well argue that waters which hold good supplies of big eels are apt to reveal that fact in ways which brook no denial, long before one can carry out the time-consuming process of getting even a rough growth rate assessment. At Abberton Resevoir, if it takes you longer than three or four hours during the day to catch an eel, and if when you catch it the weight is under three pounds-well, you've been unlucky. On present form, the eels come a bit slower at Greystone Lake, but they are as likely to be over 4¼lb. as under. Waters like Fleetwood Resevoir and the Grand Union Canal are slower still, but when they come, the eels average in the top end of the three pound range. One can therefore feel some sympathy for the angler who might argue that if, after catching a dozen or so eels from a water, you still don't know whether it has any big eels in it, then it hasn't!

Well, I would not go quite so far as that, myself; but I think it does lead to a valid point. The point is that we should not fall into the trap of regarding growth rate as the be-all and end-all, we should be "research minded" about it, regarding it as yet another potentially useful source of information about waters and seeing whether we can find correlations with <u>all</u> the other sources of information.

I emphasise tha word 'all' for a particular reason. Geoff's article illustrates very well how growth rate information might throw fresh light on a comparison of medians and quartiles from two or more waters. True enough; but why confine oneself to the median amd quartile statistics? The rate-of-catch figures also have a story to tell, indeed it seems possible that we can learn from the rates-of-catch more, more quickly and more directly about the supplies of big eels than by any other methods.

In short, let us keep growth rate work in perspective: as one of the constituent parts of the overall scheme outlined in those 1966/7 Bulletins, alongside the weight statistics, time dependant factors like rate-of-catch, condition studies,etc. For me, growth rate falls in a similar category to condition, in that we do not yet know what the angling significance really is-but we are determined to find out!

The final point I want to make arises from my comment that "it is a very big job". It is impossible to over emphasise that age estimates for odd fish are quite pointless and have no useful message for an angler, at all. (The sole exception to this that I can think of is in the case of very large specimens, where it may be of interest in connection with the "prison water theory", to find out whether the large size was due to extra rapid growth or an extended stay in fresh-water). The main reasons for this seemingly dogmatic statement are (1) eels of any particular age vary considerably around the average weight for that age (in 1966 I calculated from a large

amount of data that the variation was from about half to about twice the average, for the water and the sex under consideration); and (2) even highly skilled workers acknowledge that there are substantial errors in the age estimates from many otoliths. These two things combined mean that the weight and estimated age of a single eel cannot possible be relied upon to indicate what is typical for the water.

In order to get any sort of useful indication, a number of readings are needed, from otoliths that did not prove too "difficult", so that one can see a reasonably representative picture. By far the best way to get this picture is to strike some sort of suitable average from the readings. How many estimates are needed? This depends to some extent on the luck of the draw. If one were fortunate enough to get four of five otoliths which all showed the same age, this would give a reasonable "fix" on the average weight at that age and provide one good point on the growth rate graph; the more scattered the data are, the harder it is in general to manipulate them so as to produce reasonably good points on the graph. As an illustration I managed to squeeze two points each for both Stickney and the Grand Union Canal out of ten and eight readings respectively, as you can see by referring to the "Report on the 1967 Growth Rate Work".

So far as our panel work is concerned, I shall not let any potentially useful data lie dormant; and you can see that, with a bit of luck, useful indications can emerge from relatively few otoliths; yet at the same time we must be clear that determined efforts to collect fairly large numbers of otoliths (preferably from selected "project" waters) is the key to success- especially at this stage when we are really only trying to find out what it all might mean!

It is worth mentioning that it is not our intention to simply publish the "raw" age estimates, and leave it to individual members to struggle with the highly mathmatical task of trying to extract some sense out of them. I propose to do this donkey work centrally-there is no point in more than one of us sweating over it! -and present the information in as straight-foreward a way as possible.

However, there is a problem here which (whilst not expounding it in detail) I feel that it is important that all members should appreciate before they try to draw inferences from the growth information. To make this point, let me refer again to Geoff's excellent article, which he illustrated with some hypothetical growth curves (Fig.1.). The point is this: that if in fact we discover, as we accumulate full growth rate graphs for several waters, that they all form a nice, orderly "family" like the ones Geoff has drawn, then it will be an occasion for great rejoicing. I am afraid, however, that we are likely to be in for a rougher ride than that. In the first place, there is good reason to believe that the growth of eels do not follow simple curves (like Geoff's illustration), but instead have two bends (or inflexions as they are called) forming a sort of drawn-out S-shape. Now, unless all the curves prove to be of the same"family", data down at the bottom end near the first inflexion do not and cannot tell us where the second inflexion will be -and it is up at the top near the second inflexion that the important angling implications arise. Secondly, I am by no means confident that we shall not find cases of curves crossing over, like Geoff's example D. It seems conceivable that there might be waters which provide the right sort of food for the growth of the snaller eels, but can support only poor growth for the larger eels, and vice-versa, leading to just the sort of crossing over which Geoff suggests is not a possibility. Thirdly, there is the difficulty that the various growth curves are most closely packed together down at the bottom end where our first indications will often be, so that unless we have got a really good "fix" we shall not be able to say which out of the several of the family of curves the points really correspond to.

(continued overleaf)

This is not intended as a council of despair, but simply as a warning that members should beware the pitfalls in the interpretation of fragmentary growth data. The truth is that I have a lot of work to do, investigating methods of making sense of the data, so that members can be presented with useful, reasonably reliable, indications. This investigation can only be done using cases of full growth curves built up from our otoliths; then, if a successful method emerges, it can be applied later to more fragmentary data (this is another reason for concentrating at this stage on building up substantial collections of otoliths from project waters).

To clarify what I have in mind, the ideal solution would be to find a method of boiling down any collection of age estimations to a single growth rate "index" for the water; for our purposes, one might do this by quoting the average weight at a standard age - say eighteen years. One could then list off the waters in order of their growth rate indices, greatly facilitating comparisons and searches for the correlations with other information about the waters. Whether this ideal will prove possible in practice remains to be seen, but at least it illustrates the type of approach which I think would pay dividends. A hit-and-miss approach is rarely any use, and it's more likely to lead us up the garden path with growth rate work than almost anything else! On the other hand, with a bit of luck and vigorous support from the Club with the collection of the otoliths, we are now set to make real progress on this important and interesting front.

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LETTERS TO THE EDITOR.

Co-operation from Liverpool University. Members may be interested to know that I had a letter recently from Mr. R.S.Pritchett, who has now taken up the work formerly done by Dr. Sinha at Liverpool University. In fact, Mr. Pritchett's letter is so interesting that I asked, and obtained, his permission to quote the relevant part in full. But let me give the quotation before commenting further. Mr. Pritchett wrote:

"The work I have commenced is partly a direct extension of Dr. Sinha's work, the predation upon fish of eels over 30cm. He, himself, hardly had time to commence this, and the data are only just building up. I would like to thank your Club members for the specimens they have sent us; these have proved very valuable and it would be a great help to me if they could continue to do so. As most of your eels are far larger than we obtain by electro-fishing (eels of 30cm.-plus are relatively rare in salmonid streams) they are of enormous value to me.

" The other half of my work is upon the population, ecology and movement of eels in different waters, ranging from small mountain streams to a canal. I am also hoping to find a method of estimating the elver run of a river.

"It is a pity that the specimens from Mr. Geoff. Swailes had to remain in formalin after Dr. Sinha left until I started work, as this has made the Otoliths 'soapy' and difficult to read with any accuracy. However, all were females, confirmed histologically, and to my great delight all but three contained fish remains -small cyprinids, probably roach, bleak or minnows.

"To simplify the sending in of specimens, all I would require would be the head and stomach of the eel (the skin is of little value), together with the length, weight and date and place of capture.

"I read with great interest your superb statistical reports on the activities of the Club and would like to congratulate you on the clarity and 'applicability' of the analyses, Indeed, I have read all the issues of the Club Bulletin with delight, as I am a fisherman myself.

Yours etc., Robert S. Pritchett."

I am confident that all members will be pleased and encouraged by these kind words, and it is good to know that we are able to repay in some small way the kind help we have recieved directly and indirectly from Liverpool University, and are continuing to recieve at the present time. We all know that it is not always easy in practical angling conditions to organise the preservation of specimens and despatch to Liverpool, but I hope that members will make the effort and send at least a proportion of their larger eels, or the heads and stomachs (there are instructions about this in section 3.2 of the 'Guide'). There is no doubt that more information acrues to the Club from these professional examinations in the laboratory than from our own examinations at the waterside; the sex of the eel is confirmed microscopically, the stomach contents are identified by a trained zoologist, and, incidentally, the otolith readings would provide the Club reading pabel (consisting of Geoff Swailes, Alan Hawkins and myself) with the means to cross-check our estimates in appropriate cases.

13. Luxemburg Gardens,
London, W.6. T.M.Coulson.
recieved for publication 8/3/70.

Another member has also made contact with Mr. Pritchett, and here is a part of his letter... (ed)

At the moment I'm trying to find time to start otolith reading which I hope to start soon. Incidentally, I've made contact with a Bob. Pritchett who is doing research on eels, and we've had quite a few interesting talks. I believe Terry has written about sending stomachs to Bob, and I hope members will co-operate. As I told Terry, if members will supply their own formalin, I will supply them with polythene bags to send them in.

28, Lawrence Avenue,
St. Annes-on-Sea. Alan Butterworth.

Report Error. Glancing through 'A Report on the 1969 Reporting Schemes' a few days after I had despatched it to members, I noticed a fairly obvious error. It may be as well to draw it to member's attention before they draw it to mine! In Section 3.4, paragraph 3, I followed the same argument as in the previous Report, simply substituting the new figures. This is not quite correct, of course, because the 'large food items' are no longer all fish. In fact, although 22% of the 1968-9 eels had large food items in the stomach, only 18% had fish in the stomach. Thus, the statement in section 3.4, paragraph 3, should read "In other words, 9% of all eels caught were in the process of eating large meals of two or more fish." I do not think this amendment from 11% to 9% affects the argument in any way, but it as well to get it right.

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