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Summary

This study was conducted in Kongsfjorden,Svalbard,from middle March out April 1984.Local Greenland sled dogs were used to locate ringed seal subnivean lairs.A total of 90 lairs were found and excavated.28 were classified as birth-lairs,22 as rutting male lairs (tiggak-lairs) and 40 as unidentified lairs. First birth-lair was registered March 24th.There was significantly more snow covering birth-lairs than tiggak-lairs,and birth-lairs were also shown to be significantly larger than tiggak-lairs. The exact position of the different lairs in the fiord were plottet on a map.Distances between neighbouring seal lairs were calculated and used as an indicator of territorial size.

19 lairs were attacked by polar foxes,with 6 of these resulting in a kill (31.6%).13 lair were attacked by polar bears which resultet in one kill (7.7%).

Introduction

The ringed seal (Phoca hispida) is probably the most abundant seal in the northeast Atlantic and Arctic oceans (Stirling & Calvert 1979).Ringed seals associate closely with land-fast sea ice in which they maintain breathing holes with the aid of their foreflippers.When sufficient snow accumulates the seals may dig haul-out lairs in the snow covering these breathing holes (Smith & Stirling 1975),which offer protection from predators and cold. In late March and April females give birth to a single pup,which is usually born in a lair,appropriately called the birth lair (Fig.1).

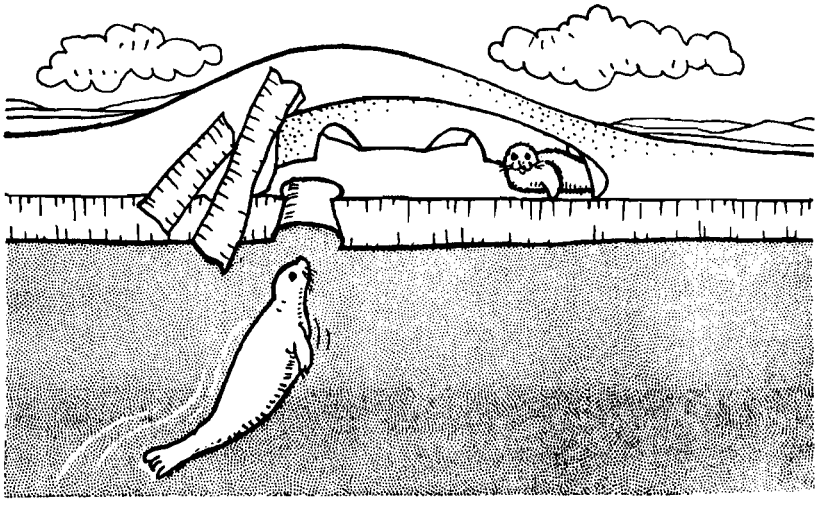

Fig.1 Cross section of birth lair (Gjertz & Lydersen 1983).

Birth lairs may be recognized by the presence of placental remains,hair of the white-coat (lanugo) and by the pups characteristic tunneling in the lair (Smith & Hammill 1981).Placental remains are however quickly removed so the odeur will not attract predators (Stirling 1977).Besides birth lairs other specialized haul-out lairs have been recorded.Smith & Stirling (1975) mention suckling-,learning-,and escape lairs for pups and in addition rutting male lairs and communal lairs used by several seals.

Ringed seals comprize a major part of the polar bear's (Ursus maritimus)diet.Lønø (1970) has shown that polar bears in the Svalbard area feed almost exclusively on ringed seals during winter. In summer ringed seals are again the most important prey,but bearded seals (Erignatus barbatus) and harp seals (Phoca groenlandica) are also taken.Polar bears predate ringed seals most successfully in areas of active or moving pack ice and along the edge of the fast ice or floe edge (Stirling et al. 1975).The prime breeding habitat of ringed seals located in ice hummock areas is less successfully preyed upon by bears than other ice types (Smith 1980).The complexity of the birth lairs and possible olfactory confusion may account for this.Stirling & Archibald (1977) found that 54.8% of the seals killed by polar bears in the fast ice areas were pups.According to Smith (1980) polar bears kill mainly newborn pups in their birth lairs.Arctic foxes (Alopex lagopus) which enter birth lairs and kill pups are also important predators (Fig.2).Smith (1976) estimated that arctic foxes predate on average 26.1% of ringed seal pups in nearshore sea ice areas.

Fig.2 a. Arctic fox locating ringed seal birth lair (Smith 1976).

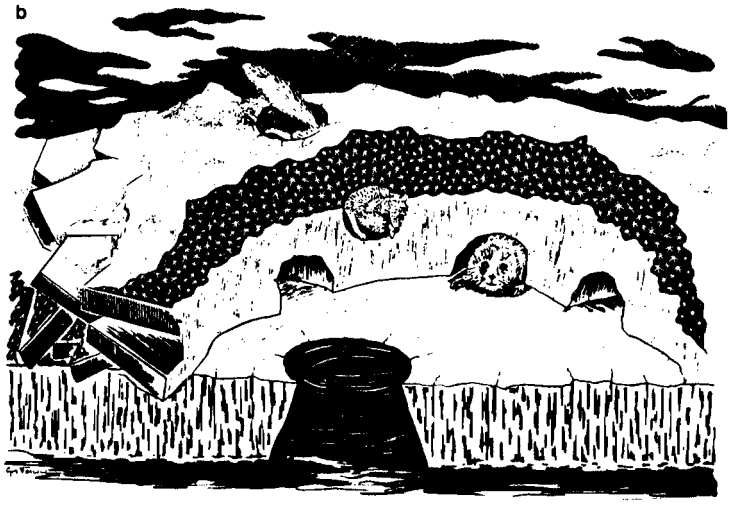

Fig.2 b. Arctic fox entering the birth lair through the snow dome (Smith 1976).

Effective polar bear management is dependent upon a thorough knowledge of its major prey species,but little research has been carried out on ringed seals in Svalbard.Taugbøl (1982) studied the thermoregulation,energybalance and developement of West Spitsbergen ringed seal pups during their first few weeks after birth. Taugbøl classified the subnivean lairs he found and registered their microclimate and all attempts of polar bear predation on seals in them.Gjertz (1983) studied the ringed seal spring diet in West Spitsbergen,while Lydersen (1984) investigated population parameters of West Spitsbergen ringed seals.The main objectives of this study were to investigate the distribution,abundance and structures of subnivean lairs in a West Spitsbergen fjord and to try to establish to what extent polar bears and arctic foxes prey upon ringed seals in a fjord ice area.

Material and methods

Kongsfjorden (Fig.3) was chosen as study area because Ny Ålesund, with its scientific base,offers excellent facilities for high arctic research.Kongsfjorden is a good breeding area for ringed seals and a previous study of ringed seal birth lairs has been conducted there (Taugbøl 1982).

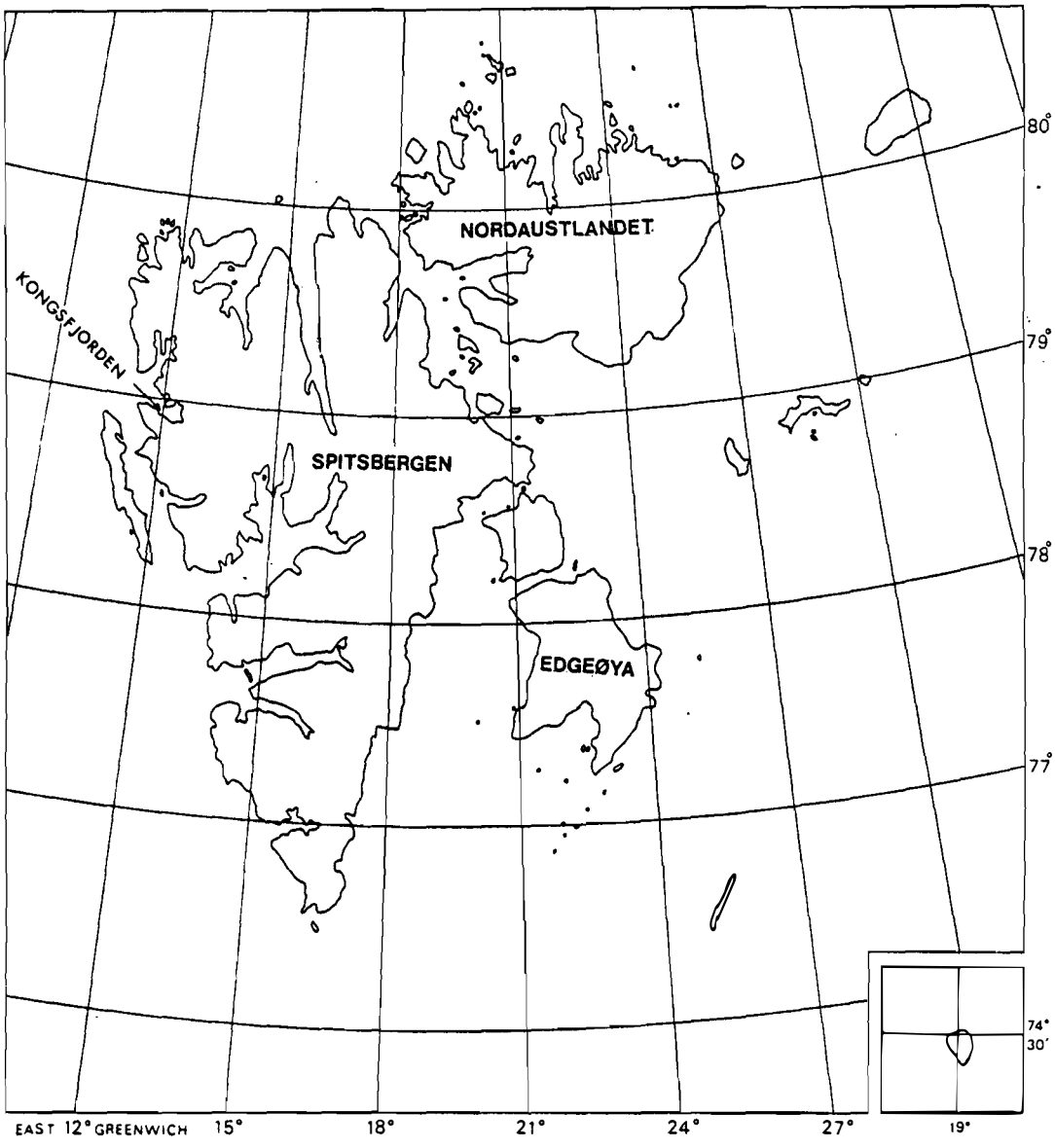

Fig.3. Map of Svalbard 1:4000000 showing Kongsfjordens location.

The Kongsfjorden ice cover on March 15th was as shown in Fig.4 A.

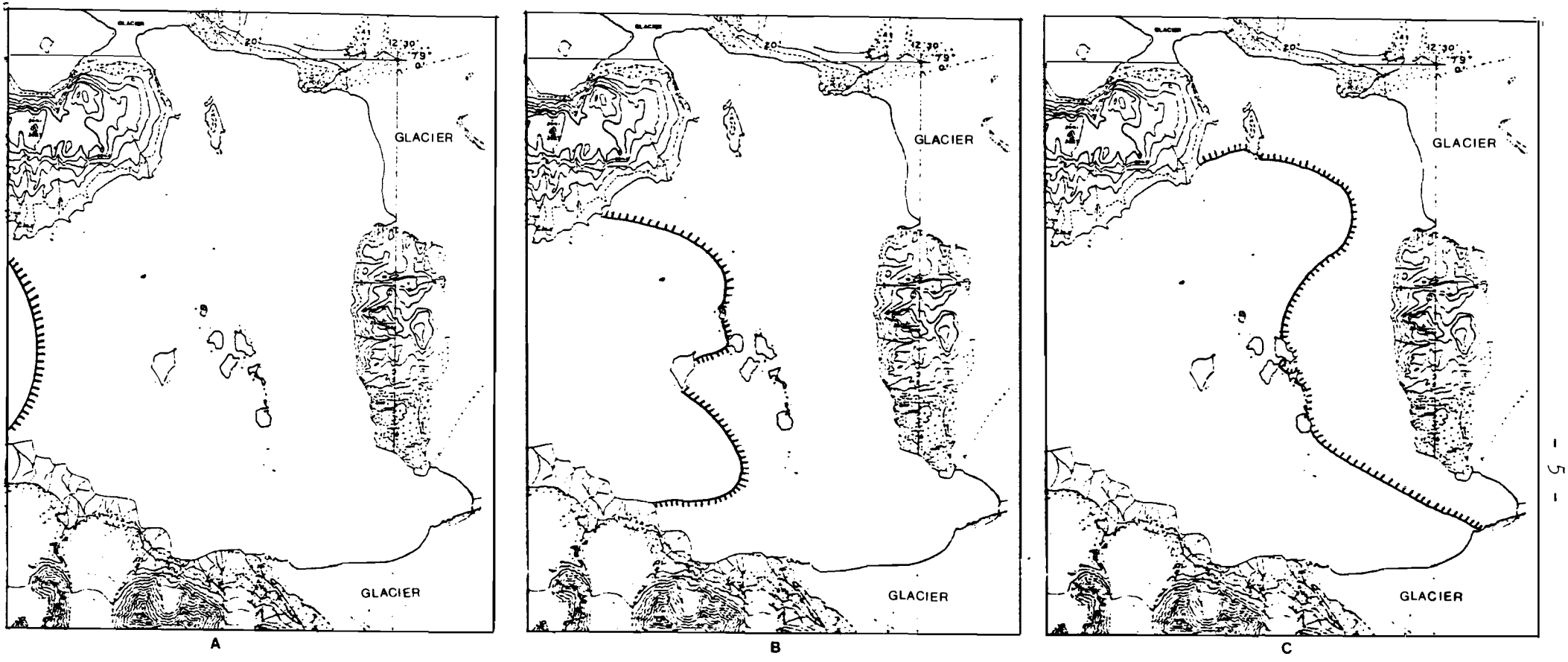

Fig.4

Figures A,B and C show three successive stages of the Kongsfjord fast-ice edge:
A=March 15th B=April 10th C=April 19th

=fast-ice edge

The fjord was covered by winter ice with areas of pressure ridges and glacier ice favorable for seal lairs (Fig.5).The snow cover varied during the study period with precipitation and wind,but was on average about 15cm on flat fjord ice.Kongsfjordens ice - cover changed throughout the study period due to large areas of the fast ice drifting to sea (Fig.4 B,C).This was mainly caused when waves from the west were followed by strong eastern winds.

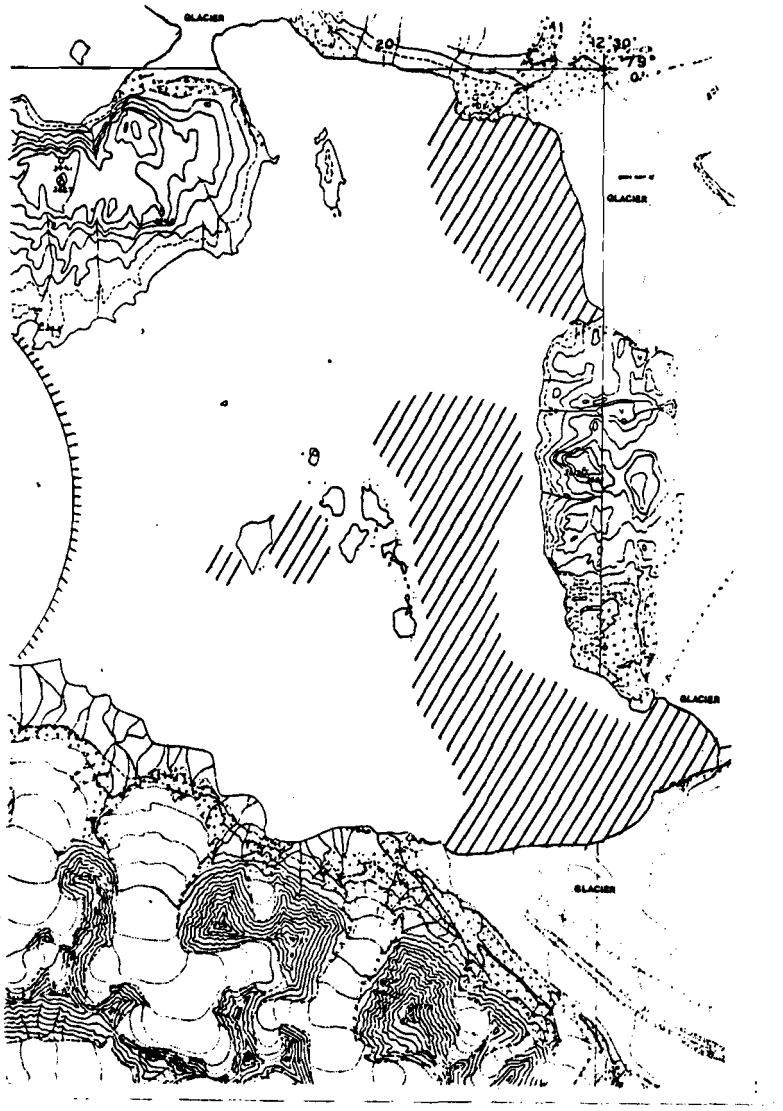

Fig.5

Map of the Kongsfjord ice cover March 15th. Areas with snow and ice conditions favorable for ringed seal lairs are hatched.

=fast-ice edge

The fjord ice was systematically searched for seal lairs.For practical reasons the search for lairs started in the northern parts of the fjord.The southeastern part which contained areas well suited for seal lairs (Fig.5) was not completely searched due to the disappearance of large parts of the ice (Fig.4 C).Dogs were used to locate the lairs,but the authors,who accompanied the dogs on skis also used probes to check snowdrifts for possible lairs. Lairs newly opened by predators could easily be sighted by the authors,eventhough the dogs often disregarded them.With strong winds the search was called off because winds prevented the dogs from making a thorough search for lairs.Trained dogs could not be brought from Norway and used in this study due to strict rabies quarantine regulations between Svalbard and Norway.Local Greenland sled dogs were therefore used.

When a dog got scent of a lair it would try to pounce on the roof of the lair in order to breach through.If this did not succeed the dog would dig until the lair was reached.Dogs would also pounce on ringed seal breathing holes,but as this study was concerned only with lairs,breathing holes were not of interest.

Once located each lair was excavated,geographically orientated and classified in the following manor:

1.Birth lair=lair containing evidence of a birth having occured, or with tunnels dug by pup.

2.Rutting male lair=tiggak lair=haul out lair with the males characteristic smell.

3.Indet lair=lairs not belonging to 1 or 2.

The following measurements were taken:maximum hight of lair, maximum depth covering lair,location of breathing hole and the lairs linear dimensions.The linear dimensions were to be used to draw each lair to scale on graph paper(see appendix).Signs of predator activity were noted and if the lair was opened by predator the

digging site and predator success were noted.The lairs precise location on the fjord ice was determined with the aid of a laser rangefinder.

To compare the sizes of tiggak- and birth lairs the area of each was calculated from the graph paper scale drawing.Areas in birth lairs obviously excavated by the pup were excluded.The distance from a tiggak lair to the nearest birth lair and tiggak lair ,and also the distance from a birth lair to the nearest birth lair,were calculated by plotting each lair on a map of the study area and measuring the distances between them.

Results.

Only areas to the lee and windward sides of ice hummocks or along pressure ridges had sufficent snow for lair construction. A total of 90 lairs were found and excavated.Twenty-eight of these were classified as birth-lairs and twenty-two as tiggak-lairs (Table 1).

Table 1.Measurements from different types of subnivean lairs.

Classification	Numbers	Mean max.hight of lair (cm)	Range of max. hight (cm)	Mean snow depth (cm)	Range of snow depth (cm)
Birth lairs	28	31 ± 6	15 - 40	89 ± 15	65 - 130
Rutting male lairs	22	30 ± 11	10 - 60	75 ± 16	45 - 100
Unidentified lairs	40	31 ± 7	20 - 60	91 ± 24	55 - 145
Total number lairs	90	31 ± 9	10 - 60	87 ± 20	45 - 145

The first birth-lair was registered on March 24th.Table 1 also shows that the range of snowdepth covering lairs varied between 45-145 cm.The maximum height in the different lairs varied between 10-60 cm.

Table 1 showed the mean maximum height in birth- and tiggak-lairs which were 31 ± SD 6 cm and 30 ± SD 11 cm repectively.The mean snow depth covering the lairs was for birth-lairs 89 ± SD 15 cm and for tiggak-lairs 75 ± SD 16 cm.A Mann-Whitney-U-test showed that there was significantly more snow covering birth-lairs than tiggak-lairs ($p<0.0113$).

The mean areas of birth- and tiggak-lairs are shown in table 2.

Table 2 Size (in m^2) of birth- and tiggak-lairs.

Type of lair	$\bar{X}$ (m^2)	Range (m^2)
Tiggak lair	2.4 ± SD 1.4	0.8 - 5.5
Birth lair[X]	4.3 ± SD 2.6	1.2 - 13.3

X=Sizes of birth lairs are minus areas obviously dug out by the pup.

Birth-lairs were shown to be significantly larger than tiggak-lairs (Mann-Whitney-U-test, $p<0.0012$).

Lairs of the same type situated in the same snowdrift or within a 200 m radius were considered as belonging to the same complex, i.e. inhabited by the same animal. This gives a total of 24 birth-lair complexes and 20 tiggak complexes discovered in the study area.

The distances from; one birth-lair complex to the nearest other birth-lair complex; one birth-lair complex to the nearest tiggak complex; one tiggak complex to the nearest other tiggak comlex are shown in table 3.

Table 3 Mean distance (in meters) from one birth-/tiggak lair to the nearest situated birth-/tiggak lair.

Distance to/from	Birth lair $\bar{M}$ (m)	Tiggak lair $\bar{M}$ (m)
Birth lair	513 ± SD 336	512 ± SD 328
Tiggak lair	512 ± SD 328	598 ± SD 252

The distances between the different structures seem to be of the same order.

Figure 6 shows the sites of all lairs discovered. Lair-rich areas coincide with areas hatched in figure 5 as favourable for lair construction. Birth-lair 22 lay isolated in the north-westeren part of Kongsfjorden. With exeption of a few small pressure ridges this area of the fiord consisted mainly of flat ice with about 15 cm snowcover. The distance from lair no.22 to the nearest other lair was about 5000 m. In between only breathing-holes could be found.

Lairs attacked by arctic foxes or polar bears are listed in Table 4. Lairs attacked by arctic foxes had from 1 to 6 entry holes after foxes. These holes seemed to be randomly distributed compared to the lair's breathing hole. A total number of 19

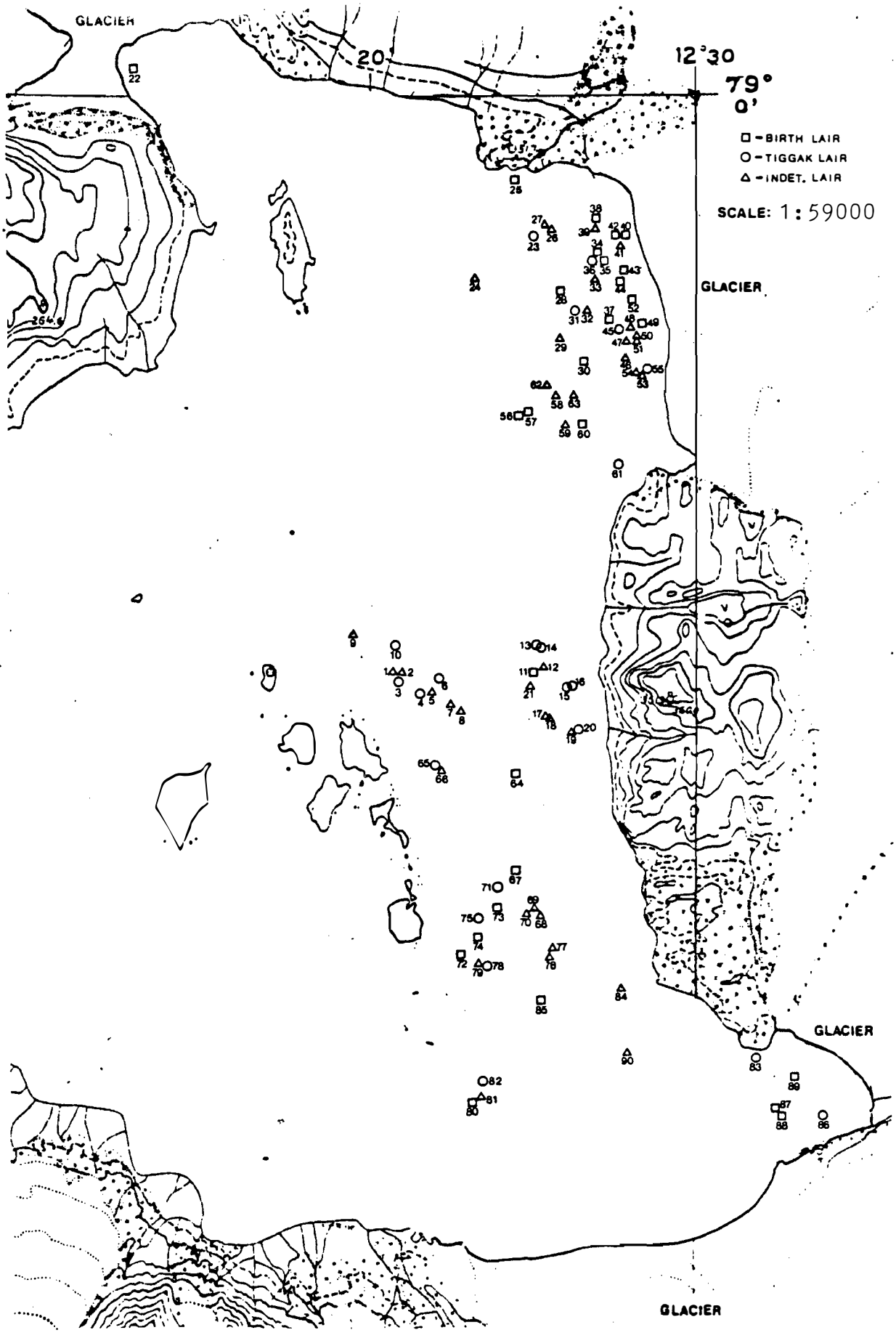

Figure 6. Map showing the inner part of Kongsfjorden with the exact positions of the different lairs.

Table 4. Arctic fox and polar bear hunting success on different types of ringed seal lairs in the study area.

Predated by	Type of lair (number in brackets=total no.observed). Birth lair (28)		Rutting male lair (22)		Unidentified (40)	
	no.attacked	no.killed	no.attacked	no.killed	no.attacked	no.killed
Arctic Fox	13	5	0	0	6	1
Polar Bear	4	1	2	0	7	0
Total	16[I]	6	2	0	13	1

I=One lair had been attacked by both fox and bear.

lairs with signs of fox attack were found. In 6 of these there was evidence of a seal being killed (31,6%). 13 attacks by fox on birth-lairs were registered. In 5 cases had the pup been killed. This could be shown by the lanugo and/or claw remains present in the lair. Foxes had no registered attacks on tiggak-lairs, however 6 attacks on indet.-lairs were registered. Only in one of these there was signs of a kill. Except for blood, there were no remains present to indicate weather the seal killed was a white coat or not. Taking into consideration the difference in size between an arctic fox and an adult ringed seal then most likely the seal killed was a white coat.

Tracks from the arctic fox showed that it systematically searched through areas with enough snow for ringed seal lairs. Often it would mark a lair with urine or feces without digging into it. In lair attacked by arctic foxes feces and urine were usually found on top of or inside the lair.

Lairs attacked by polar bears had from 1 to 3 digging sites, often located close to the breathing hole. Polar bears were registered to have attacked 13 lairs. In 1 of these (7,7%), a birth-lair, a white coat was killed. 2 polar bear attacks on tiggak-lairs were registered as compared to none by polar foxes.

The polar bear tracks show that it too systematically searches through areas for possible lairs.Often arctic fox tracks follow the bear tracks.This indicates that the arctic fox may be scavenging the remains of seals struck by polar bears.1 birth-lair found was attacked by both arctic fox and polar bear,but with no signs of success.Obviously in this case the arctic fox made the first attack,otherwise it could have entered the lair through the holes made by the polar bear.

Discussion

The intention of this fieldwork was to register and excavate all seal lairs in the inner parts of Kongsfjorden.In all 90 lairs were registered.The area probably contained more lairs which were not discovered,the reasons for this may be several:

The dogs had a tendancy to lose interest in lair-hunting when worked too long.This,and in addition unfavorable wind conditions,may have caused the dog to overlook lairs in the area being searched.Even though the authors in addition checked through favorable areas with probes obviously some lairs may have been missed.Lairs having been attacked by predators long enough in advance for the site of attack to have been covered by snow,had less chance of being discovered.This because the dogs were rarely interested in these lairs,and they were often found with the aid of the probe.

Areas of fiord ice in southeastern parts of Kongsfjorden disappeared before they could be searched(Fig.4),and these areas contained favourable sites for lairs(Fig.5).Taugbøl (1982) found 193 lairs in Kongsfjorden in 1979.The iceconditions in 1979 were quite unusual with landfast ice stretching to the outer part of the fiord.

The effect the early disappearance of fiord ice with possible birth lairs has on ringed seal pups can only be guessed:

1) The pups take to the water and both mother and pup take refuge on the remains of the fiord fast ice,but without the protection offered by a lair.The mortality of such pups will probably increase due to a higher rate of predation and exposure to wind and cold.2) The mother and pup may follow the drifting ice. This may lead to a way of life more like that of pups born in the drifting ice.These have a shorter lactation period due to that unstable ice conditions lead to early separation of the mother and pup.A shorter lactation period causes pups to gain a smaller size when they become adults (McLaren 1958).

3)Mother and pup may be parted when the fiord fast ice breaks up.If this happens the pup will have to manage on its own or die.When managing on its own it may suffer from malnutrition and starvation,and become a so called starveling.McLaren (1958) assumes that starvelings were pups separated from their mothers before being properly weaned because of the ice separating from the fast-ice sheet after birth.

This study separates between three types of lairs:Tiggak (rutting male) lairs,birth lairs and indetermined lairs.Classification of all lairs other than tiggak- and birth lairs was difficult and therefore these were grouped as indetermined lairs. Smith and Stirling (1975) could not readily separate suckling and escape lairs from haul out lairs,however this was done for them by an inuit assistant.

Twentyeight of the 90 lairs found were classified as birth lairs.This is quite probably an underestimate because several haul out lairs classified as indetermined probably would have evolved into birth lairs,but were excavated before the pup was born.This was indicated by the fact that more birth lairs relative to indetermined lairs were found as the pupping season progressed.

We found the minimum snowdepth of excavated lairs to be 45cm. Smith and Stirling (1975) found haul out lairs in 20cm snow and birth lairs in 25cm snow.Our experience is that an adult ringed seal is at least 25cm high,we are therefore somewhat puzzled by Smith and Stirlings results.In areas with 20-25cm snow we only registered breathing holes.The snowdepth covering birth lairs was significantly deeper than that covering tiggak lairs.Deeper snow means that a predator needs longer time to penetrate the lair.It is therefore advantageous for production that females and pups have the safest lairs.The question is if ringed seals

can predict where the deepest snow will be.Areas to the windward and leeward sides of the largest hummocks and icebergs frozen in the fast-ice tend to have the deepest snow.These icebergs penetrate deepest down into the water.It is possible that ringed seals register this and that females chase away males from such areas,which they then use to make birth lairs. McLaren (1958) suggests that seals do an active choise or prediction of suitable snowdepths.

The maximum height inside the lairs varied between 10 and 60cm.Heights of 10cm are probably due to the settling of the lair roof caused by warm temperatures.Lair heights of 60cm probably correspond to the maximum reach of an adult seal lying on its side and scratching the snow with its foreflippers (Smith and Stirling 1975).A comparison of the height of tiggak and birth lairs showed that they were about the same (Table 1). Lydersen (1984) showed that ringed seal males and females in the Kongsfjorden area reach the same size,and therefore one can assume that they have the same reach when digging lairs.

A comparison of the size in m^2 of birth lairs and tiggak lairs shows that birth lairs were significantly larger than tiggak lairs (Table 2).No published information on the size of lairs could be found.The difference in size is probably due to the pregnant ringed seals need for more space in connection with the birth,whereas the male only uses its lair to haul out in.

Territorial aggression has been registered for ringed seals of both sexes during the breeding period (Stirling 1977). The size of the territories depends among other things on lair facilities.Where possibilities for lairs are many so that for instance females can dig out the necessary number of lairs in its birth lair complex within a small area, the territories will

probably be smaller than when the opposite is true.One also has to bear in mind that the territories are three-dimensional. The distances measured between the different lairs (Table 3) gives an indication of the size of ringed seal territories in Kongsfjorden in 1984.

The first birth lair was registered on March 24th.This corresponds with the usual pupping period for ringed seals in other places in the Arctic (Smith 1973,Smith and Stirling 1975, Chapskii 1940).According to Chapskii (1940) a certain Kotgoff claims that ringed seals in Spitsbergen pup at the end of June, no further information about this statement has been available, however it does not apply for ringed seals in the Kongsfjord area.

Arctic foxes had attacked 19 lairs and killed pups in six of these (Table 4).Smith (1976) has over a three year period studied the arctic fox as a predator of ringed seal lairs and found that the fox manages to kill a white-coat in 26.1% of its attempts.This figure was based on studies of 113 ringed seal lairs attacked by foxes,53.1% of which were birth lairs, 40.7% haul out lairs and 6.2% tiggak lairs.Smith suggests that the fox is not able to distinguish between birth lairs and other lairs with the possible exception of tiggak lairs.This corresponds well with our own observations,in which no fox attack on tiggak lairs was noted.

Lairs marked by the fox but not attacked were often noted. Probably the fox senses that the lair is empty,and either marks it so as to be able to find it again more easily or to keep other foxes away.The fox's site of attack on lairs did not seem to be centered on the breathing hole.One might assume that the most effective way to trap a white-coat was to dig down to the breathing hole,thus preventing the pup

from escaping.Since the fox does not do this,it probably has difficulty in sensing the location of the breathing hole when attacking a lair.

Polar bears however,often attacked the lair closer to the breathing hole.This may be by chance,but should prove to to be the most effective site of attack.A bear kills both adults and pups,so it does not matter what sized seal it corners in the lair.Of the 13 lairs attacked by bears only one showed proof of a kill (7,7%).This sample is too small to be of significance. Stirling and Archibald (1977) found that the success-rate of polar bears hunting seals at subnivean breathing holes and birth lairs varied between 6.4-8.6%.These figures were calculated from 848 bear attempts on lairs from 1971-1975.

Two polar bear attacks on tiggak lairs were registered.Smith (1980) found that only 3% of lairs attacked by bears were tiggak lairs.He feels there is strong evidence to indicate that polar bears purposely avoid digging into these lairs.He observed 9 cases of bear tracks passing closely enough to the tiggak lairs so that the bear must have detected it,but did not make any attempt to prey on it.He also mentions that Inuits in many areas do not eat meat from tiggak seals and also that sled dogs appear not to eat this meat.We could smell a tiggak lair several meters off,if the snow thickness was not too great;one may therefor expect a polar bear to be able to distinguish between this and other types of lairs.

Smith (1980) claims that seals under 2 years of age is the age-group the polar bears mostly prey on,and that harvesting these age-classes gives maximum return of energy to the bear and results in the least harm to the prey population.Whereas white-coats (0^{+}-age-group) are concerned,Smith (1976) claims that the single most important source of natural mortality

at the first year of life to the the ringed seals born in near-shore sea ice appears to be fox predation.Our studies in Kongs-fjorden seems to verify that the arctic fox is a more effective white-coat predator than the polar bear.

Mortality of ringed seal pups caused by other than predators is difficult to assess.No dead pups were found in the lairs excavated.Such incidents seem to be rare.Smith (1976) found one dead pup in 119 birth lairs.

Our material on polar bear predation on ringed seal lairs is not large enough to permit us to conclude to which degree the polar bear predation influences the seal population or the importance of ringed seals as bear food at this time of the year. If these questions are to be answered one should either track a polar bear and observe its behavior in an area,or follow bear tracks and from these register its behavior.

Aknowledgement.

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APPENDIX.

Explanations of words,abbreviations and symbols used in the following figures:

Birth-lair: characterized by remains of placenta and/or system of tunnels dug by the pup.

Tiggak-lair:haul-out lair used by rutting males;identified by its characteristic smell.

Indet.-lair:other type of lair (suckling lair,learning lair etc.) or lair of unidentified type.

M.H.- maximum height (in cm) inside the lair.

S.D.- snow depth (in cm) over M.H..

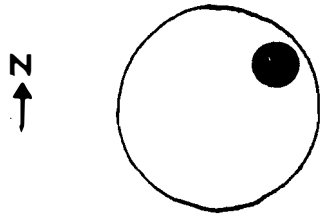
● - breathing hole.

☆ - position of polar fox attack.

★ - position of polar bear attack.

† - indicates successful attack by predator.

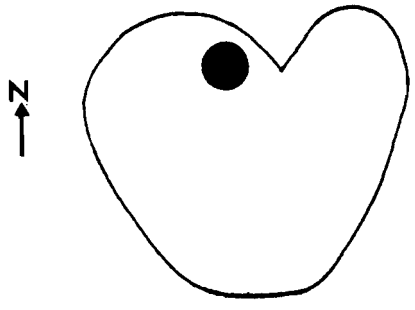
All lairs drawn in scale 1:49 .



1 Indet.lair

M.H.-35

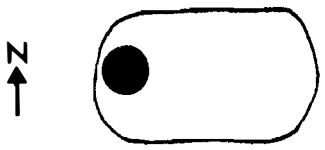
S.D.-105



2 Indet.lair

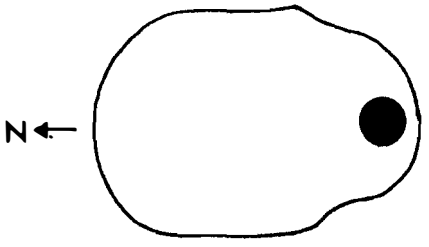
M.H.-40

S.D.-80



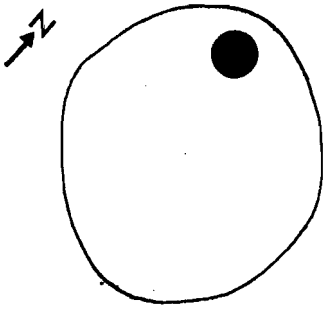
3 Tiggak lair

M.H.-30
S.D.-30



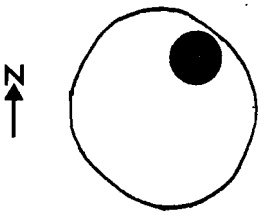
4 Tiggak lair

M.H.-20
S.D.-25



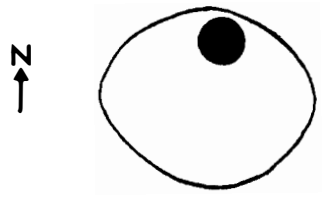
5 Indet.lair

M.H.-30
S.D.-40



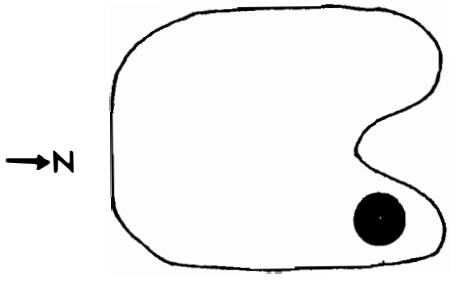
6 Tiggak lair

M.H.-60
S.D.-25



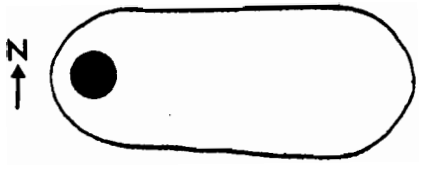
7 Indet.lair

M.H.-30
S.D.-75



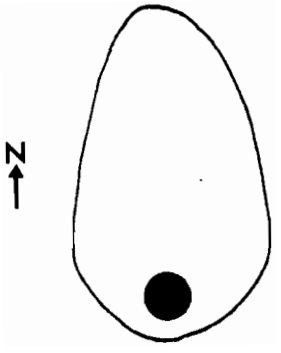
8 Indet.lair

M.H.-30
S.D.-80



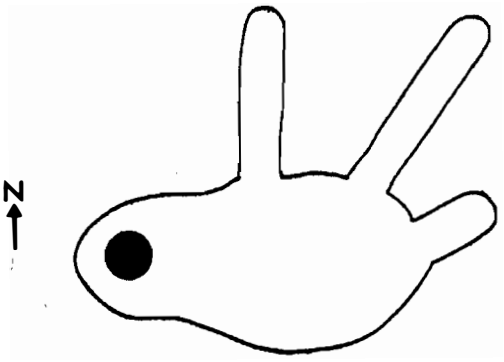
9 Indet.lair

M.H.-35
S.D.-50



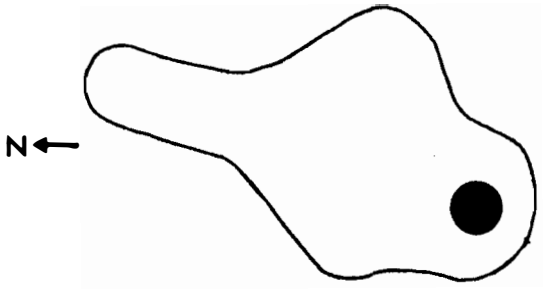
10 Tiggak lair

M.H.-40
S.D.-35



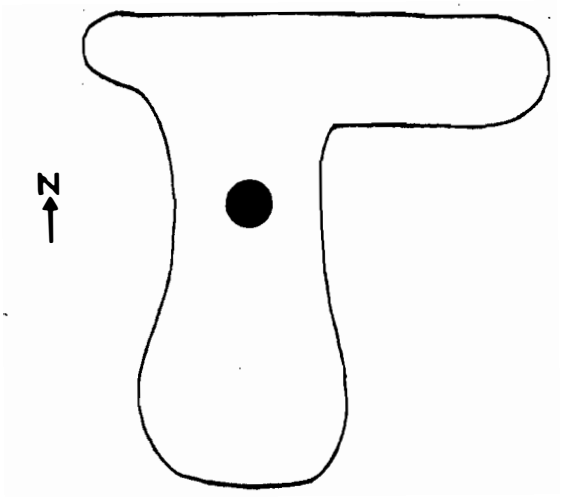
11 Birth lair

M.H.-30
S.D.-75



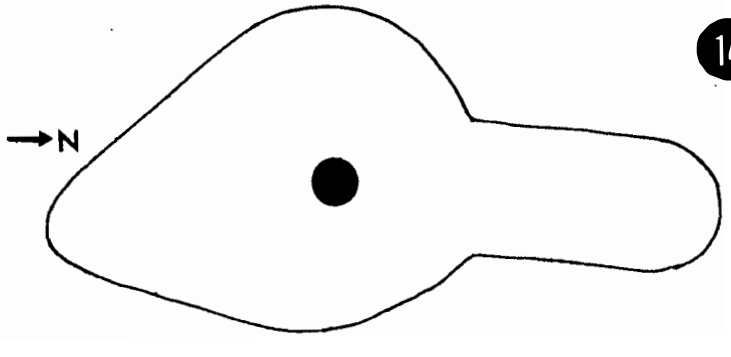
12 Indet.lair

M.H.-35
S.D.-80



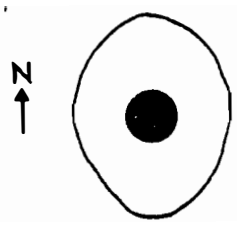
13 Tiggak lair

M.H.-30
S.D.-50



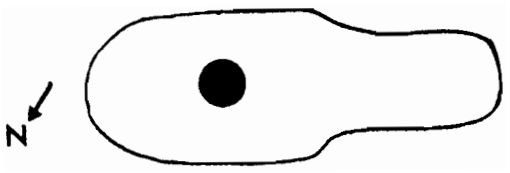
14 Tiggak lair

M.H.-30
S.D.-65



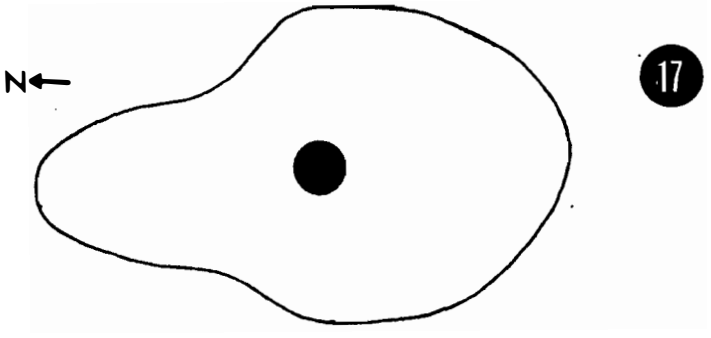
15 Tiggak lair

M.H.-35
S.D.-20



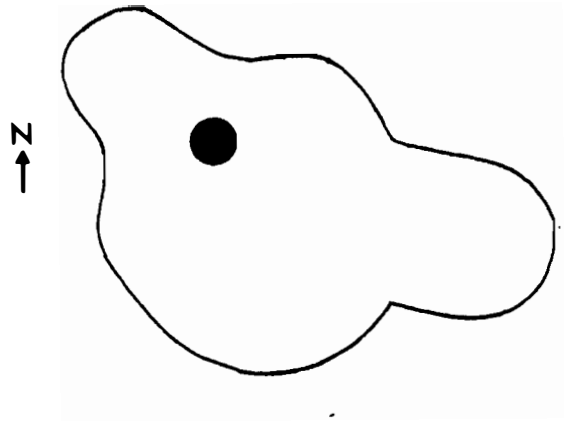
16 Tiggak lair

M.H.-40
S.D.-50



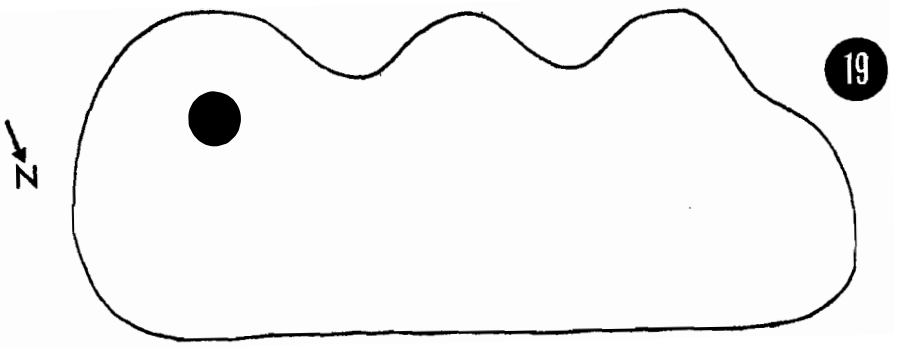
17 Indet.lair

M.H.-40
S.D.-35



18 Indet.lair

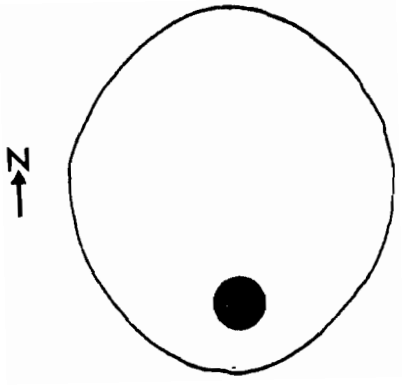
M.H.-30
S.D.-65



19

Indet.lair

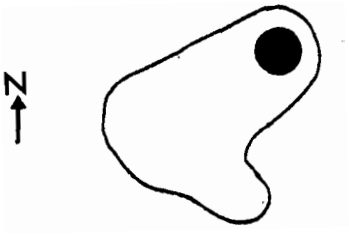
M.H.-60
S.D.-80



20

Tiggak lair

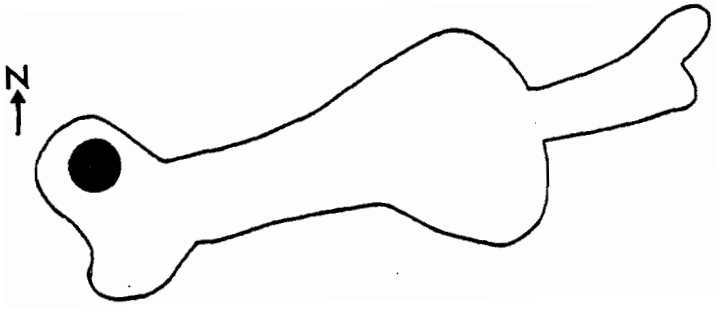
M.H.-25
S.D.-50



21

Indet.lair

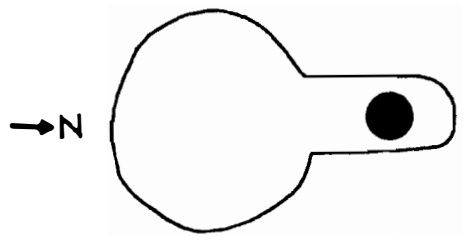
M.H.-40
S.D.-70



22

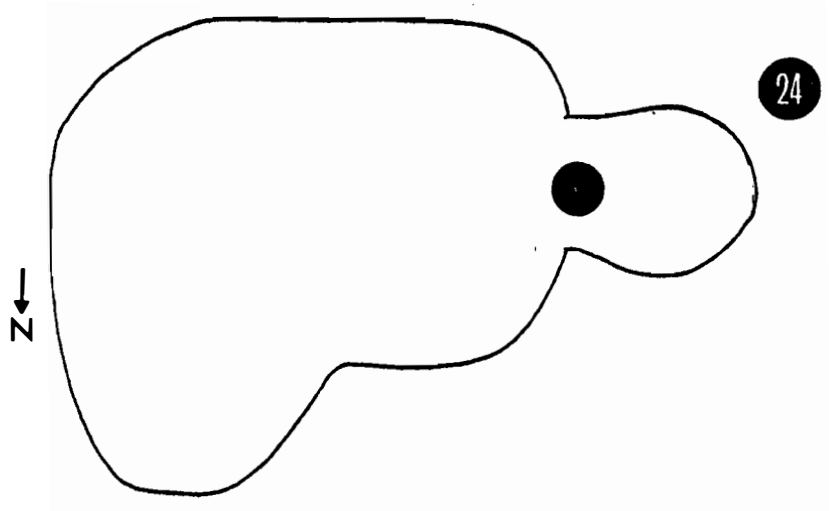
Birth lair

M.H.-35
S.D.-50



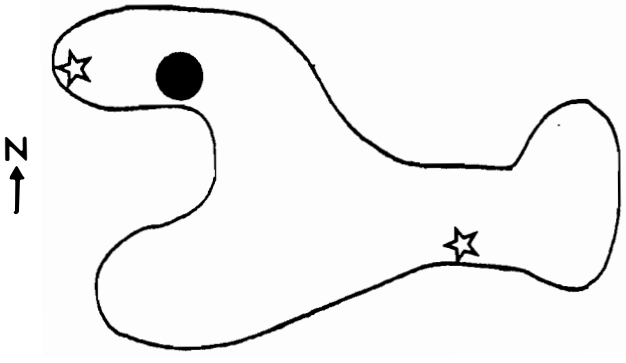
23 Tiggak lair

M.H.-25
S.D.-50



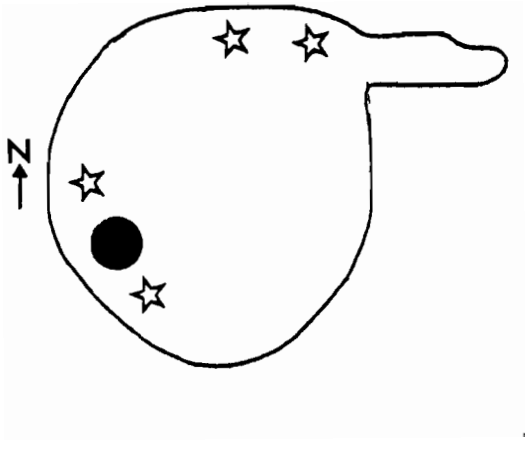
24 Indet.lair

M.H.-30
S.D.-50



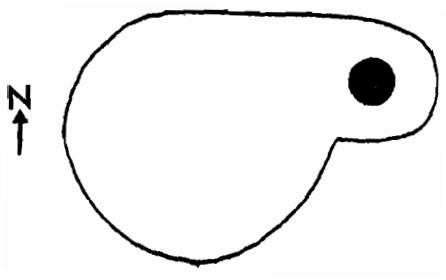
25 Birth lair †

M.H.-25
S.D.-55



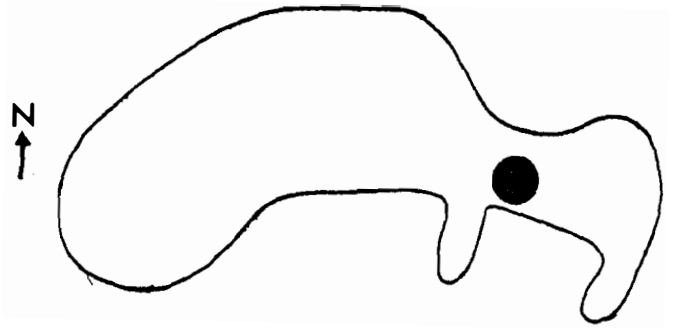
26 Indet.lair †

M.H.-20
S.D.-50



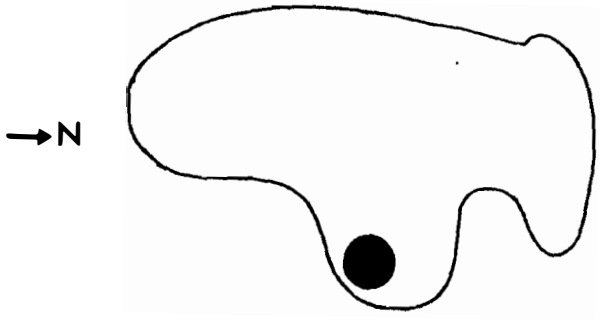
27 Indet.lair

M.H.-30
S.D.-40



28 Birth lair

M.H.-30
S.D.-60

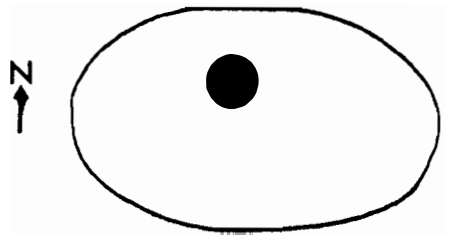


29 Indet.lair

M.H.-40
S.D.-40

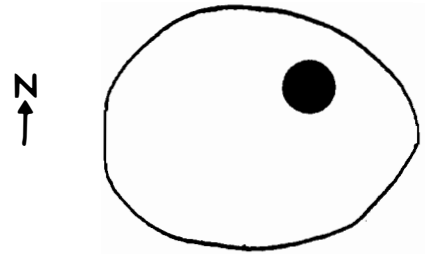
30 Birth lair †

M.H.-25
S.D.-70



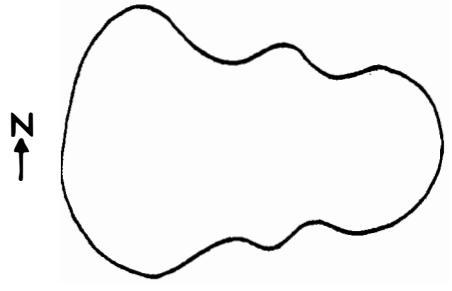
31 Tiggak lair

M.H.-35
S.D.-45



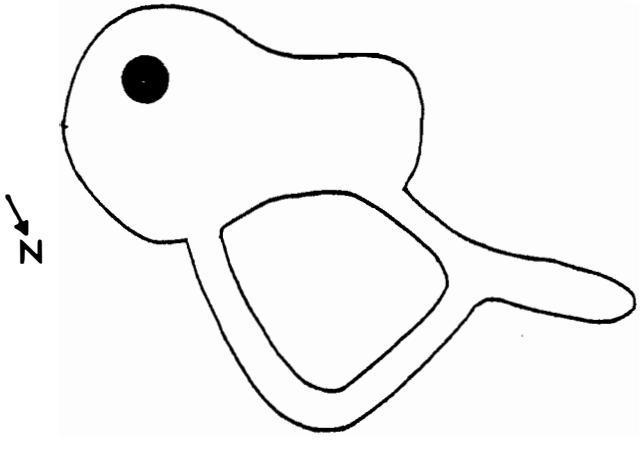
32 Indet.lair

M.H.-25
S.D.-60



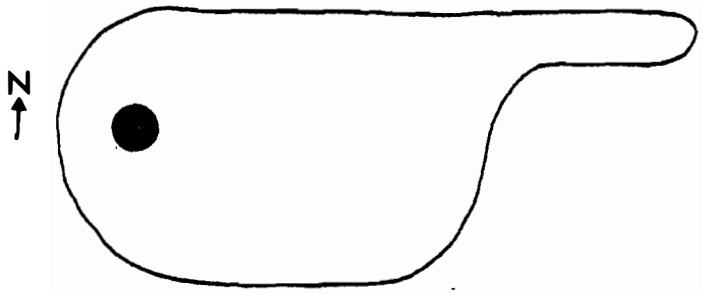
33 Indet.lair

M.H.-25
S.D.-70



34 Birth lair

M.H.-40
S.D.-50

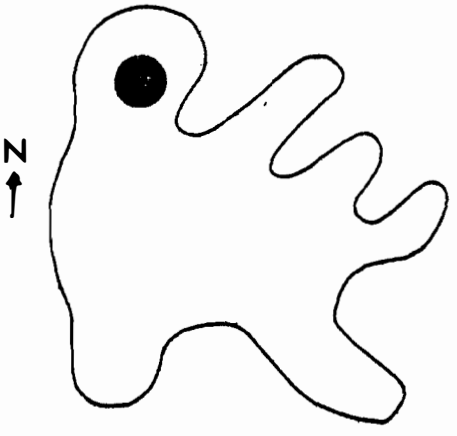


35 Birth lair

M.H.-30
S.D.-40

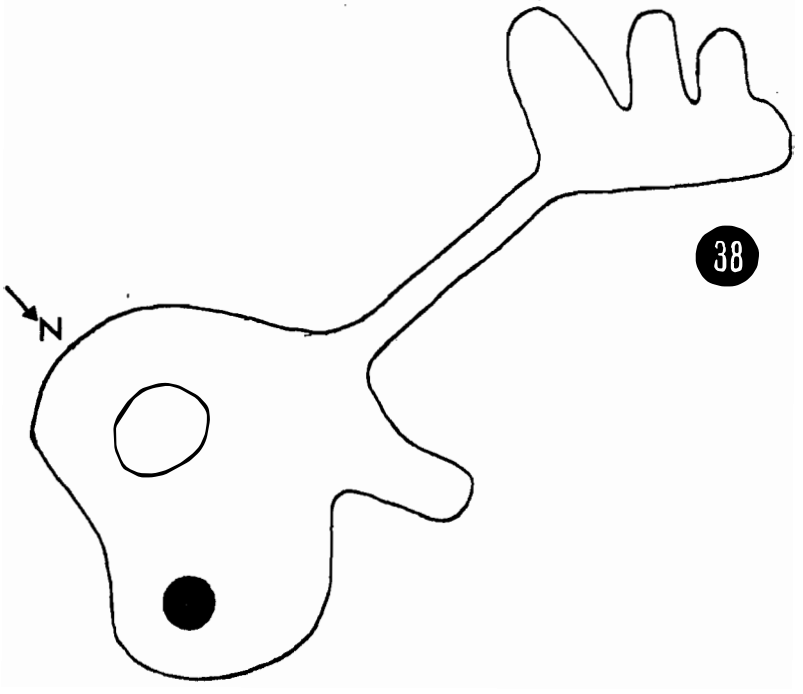
36 Tiggak lair

M.H.-30
S.D.-25



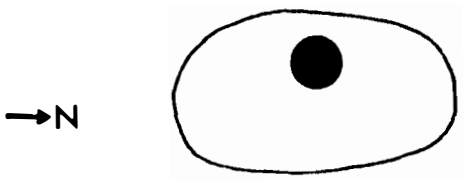
37 Birth lair

M.H.-30
S.D.-40



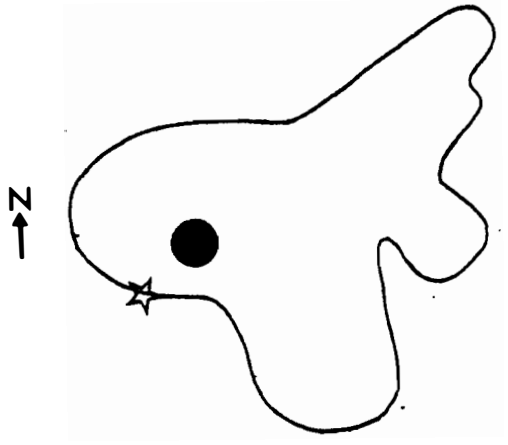
38 Birth lair

M.H.-30
S.D.-50



39 Indet.lair

M.H.-30
S.D.-30

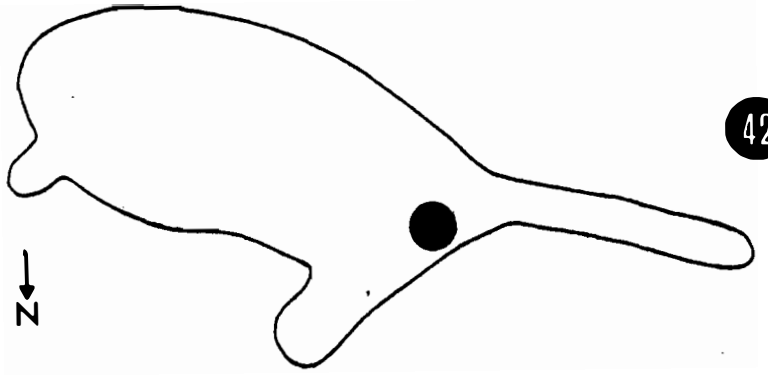


40 Birth lair

M.H.-40
S.D.-60

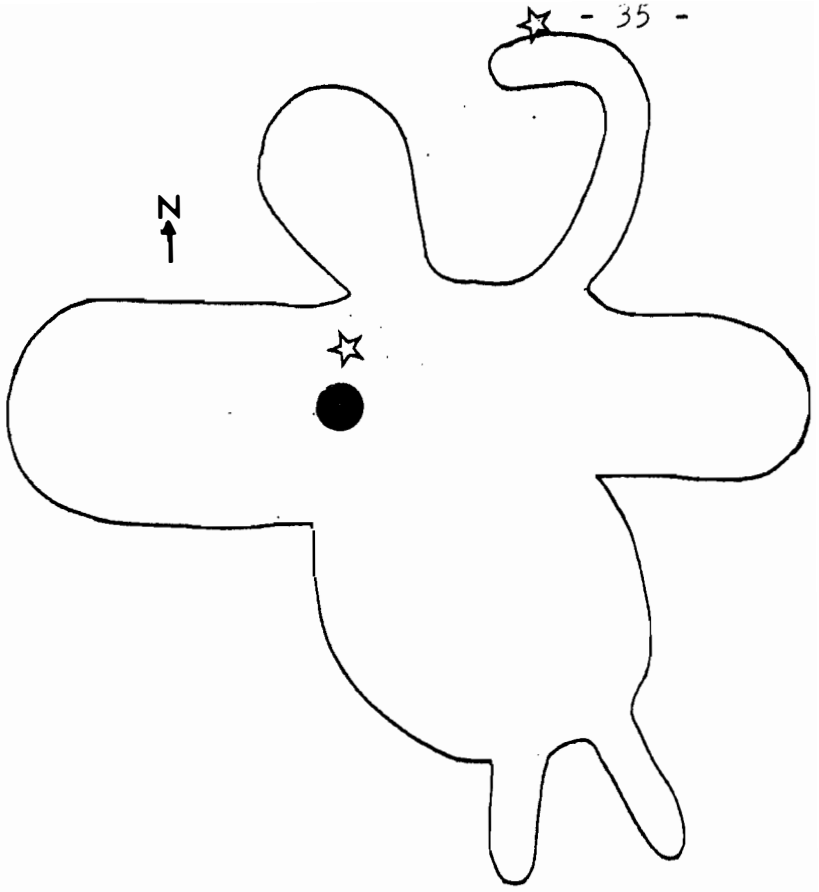
41 Indet.lair

M.H.-25
S.D.-40



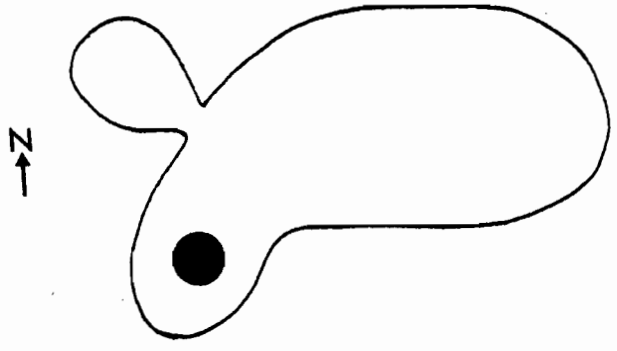
42 Birth lair

M.H.-40
S.D.-50



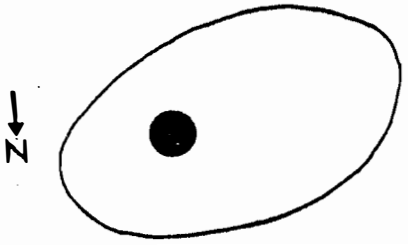
43 Birth lair †

M.H.-30
S.D.-65



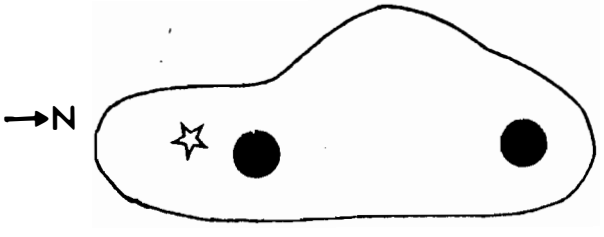
44 Birth lair

M.H.-25
S.D.-60



45 Tiggak lair

M.H.-35
S.D.-50

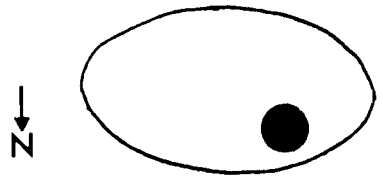


46 Indet.lair

M.H.-30
S.D.-50

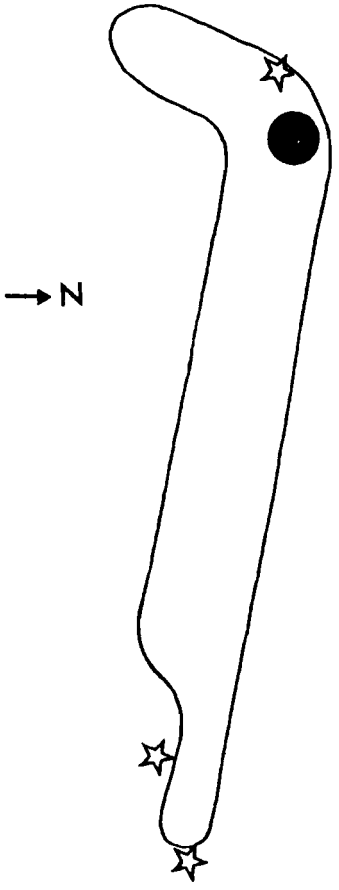
47 Indet.lair

M.H.-30
S.D.-55



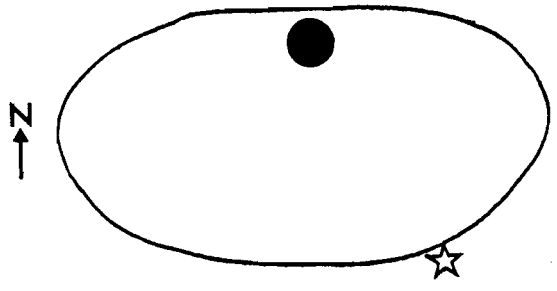
48 Indet.lair

M.H.-35
S.D.-60



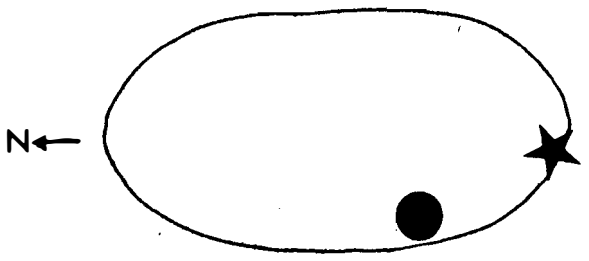
49 Birth lair †

M.H.-25
S.D.-90



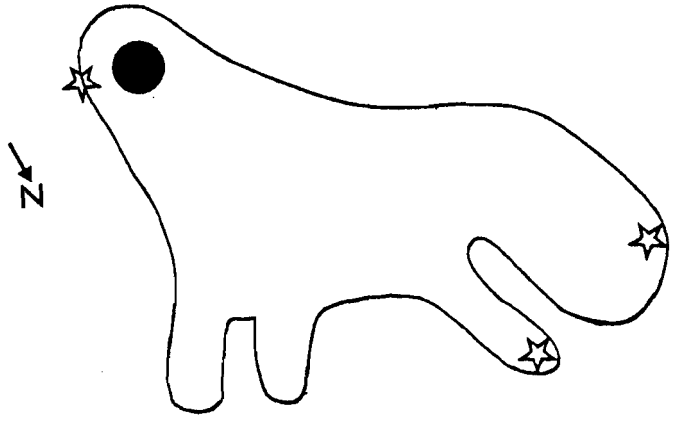
50 Indet.lair

M.H.-20
S.D.-60



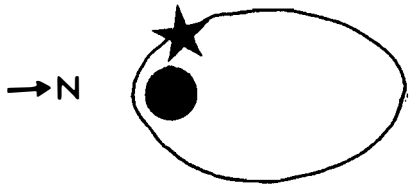
51 Indet.lair

M.H.-30
S.D.-50



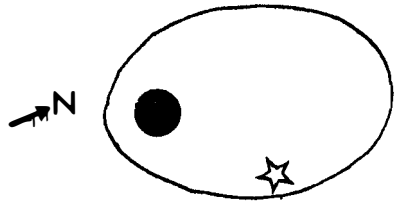
52 Birth lair †

M.H.-30
S.D.-60



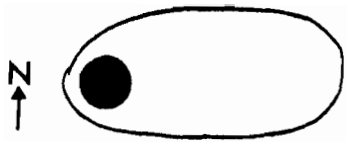
53 Indet.lair

M.H.-30
S.D.-70



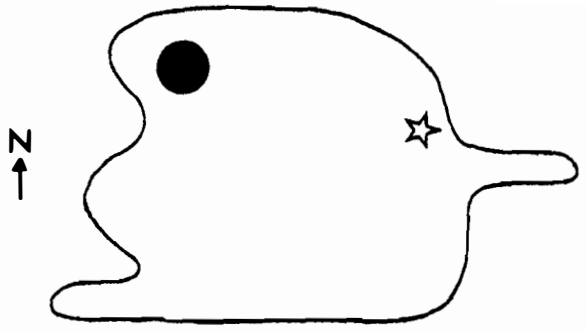
54 Indet.lair

M.H.-30
S.D.-80



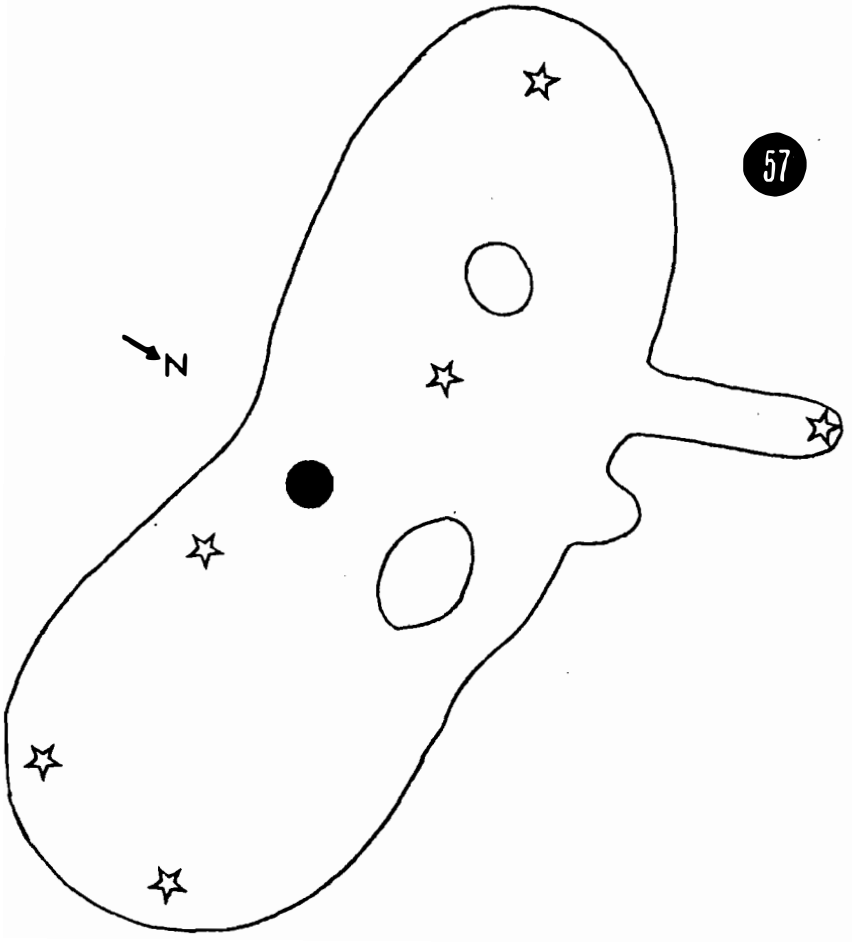
55 Tiggak lair

M.H.-10
S.D.-90



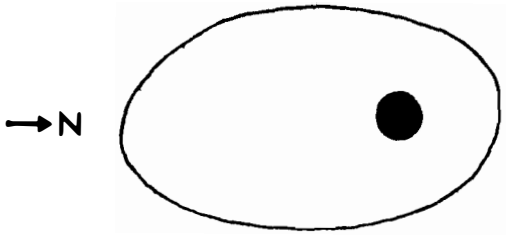
56 Birth lair

M.H.-40
S.D.-60



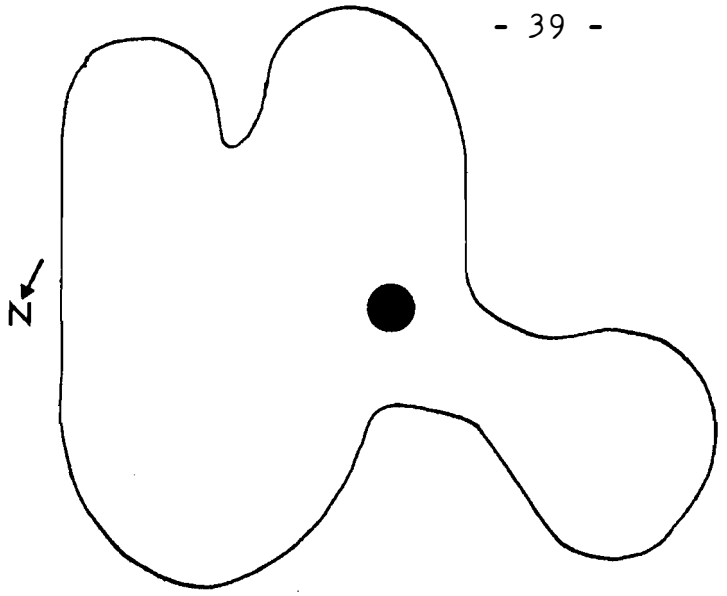
57 Birth lair

M.H.-35
S.D.-30



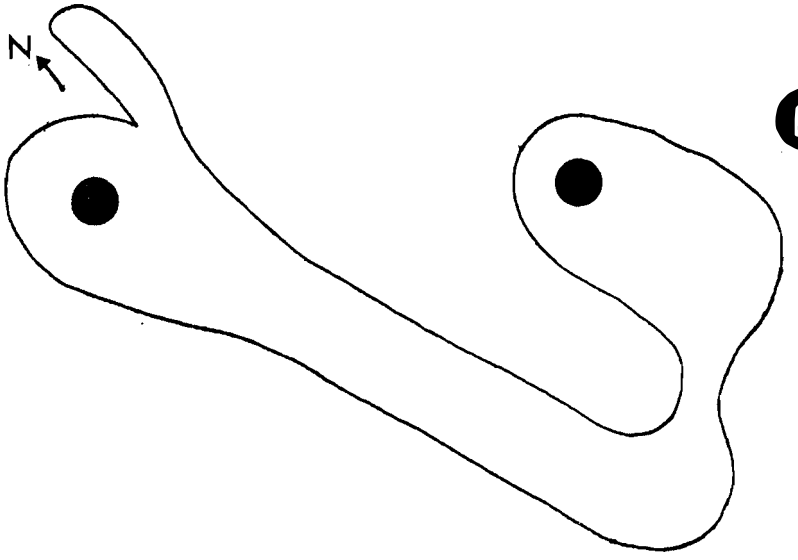
58 Indet.lair

M.H.-30
S.D.-35



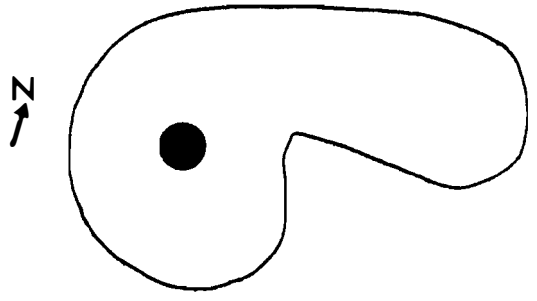
59 Indet.lair

M.H.-25
S.D.-65



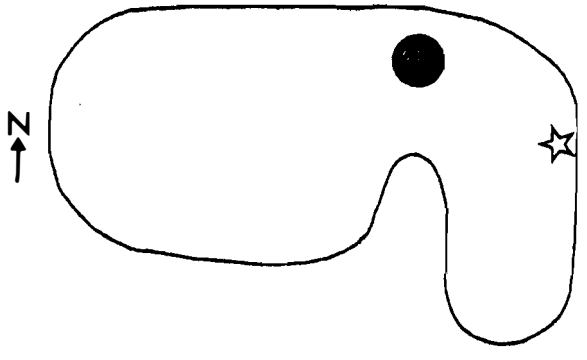
60 Birth lair

M.H.-30
S.D.-100



61 Tiggak lair

M.H.-30
S.D.-60

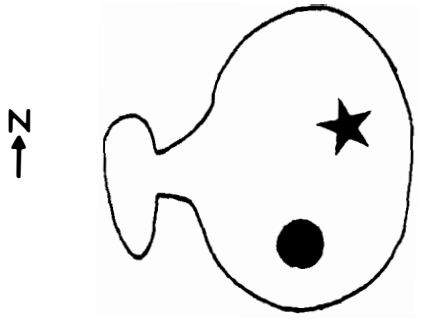


62 Indet.lair

M.H.-25
S.D.-45

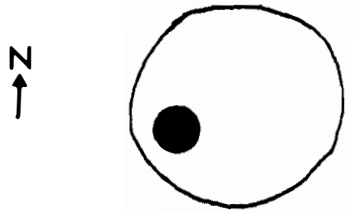
63 Indet.lair

M.H.-25
S.D.-55



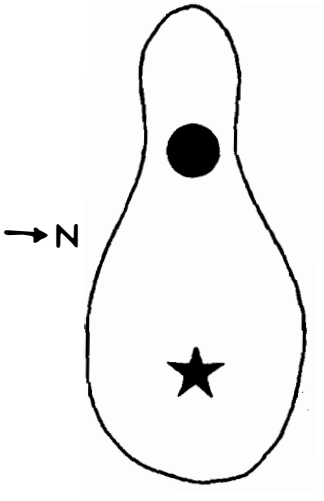
64 Birth lair

M.H.-30
S.D.-30



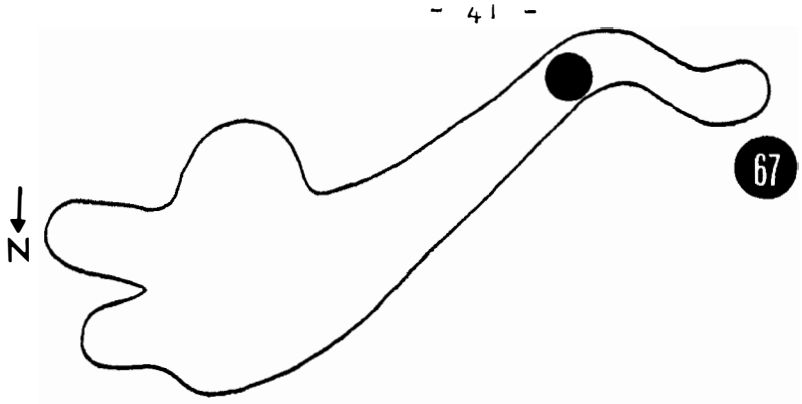
65 Tiggak lair

M.H.-20
S.D.-25



66 Indet.lair

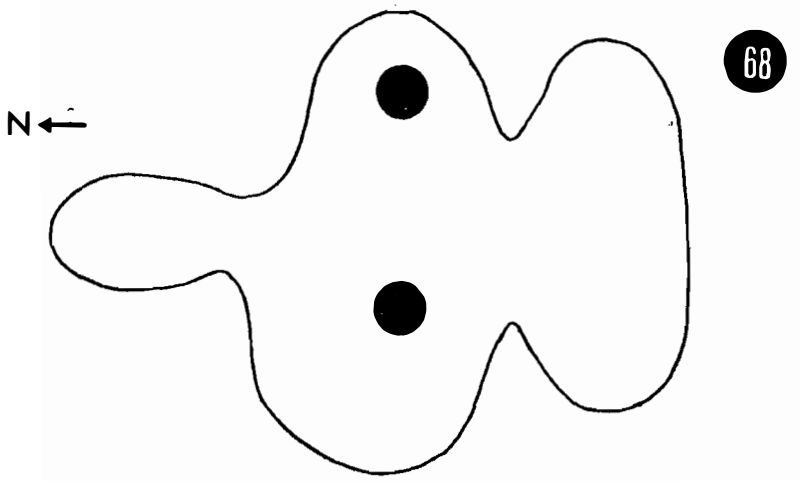
M.H.-30
S.D.-70



67

Birth lair

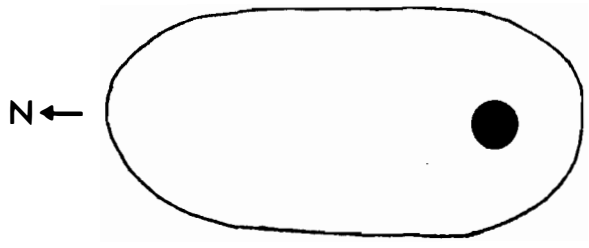
M.H.-25
S.D.-90



68

Indet.lair

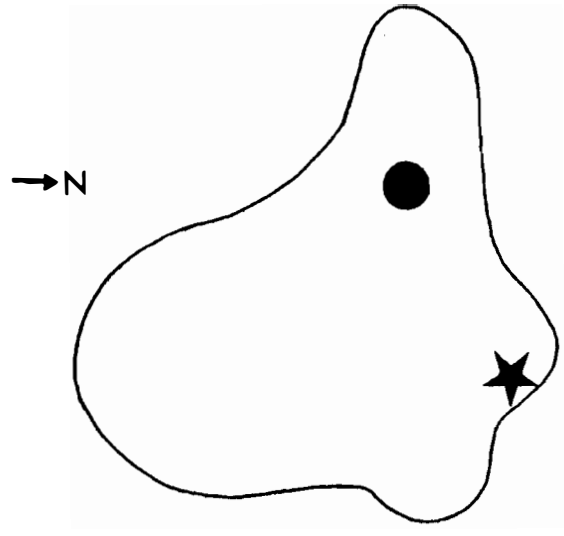
M.H.-30
S.D.-80



69

Indet.lair

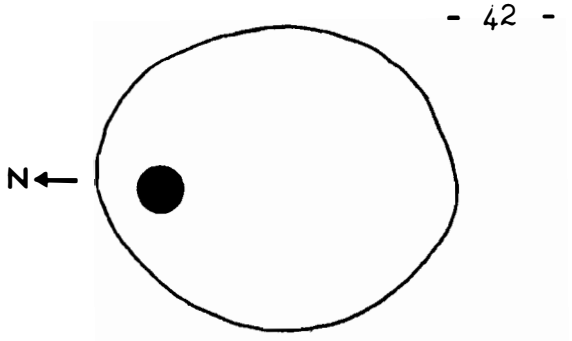
M.H.-45
S.D.-100



70

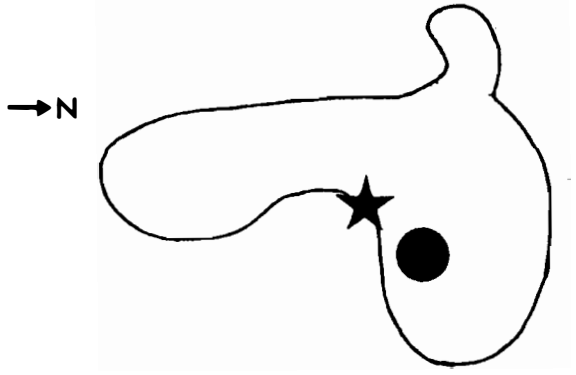
Indet.lair

M.H.-30
S.D.-110



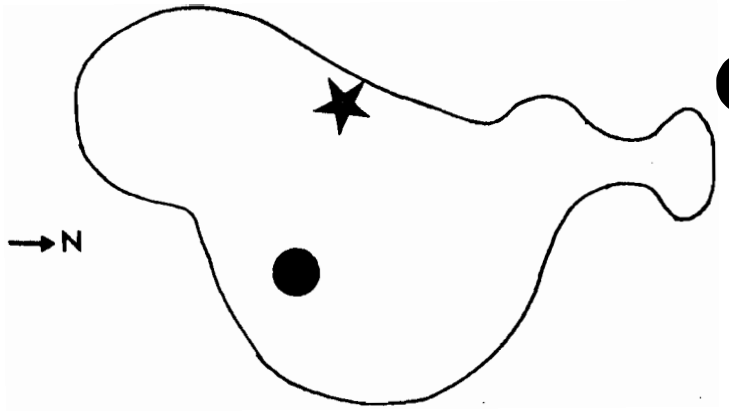
71 Tiggak lair

M.H.-25
S.D.-70



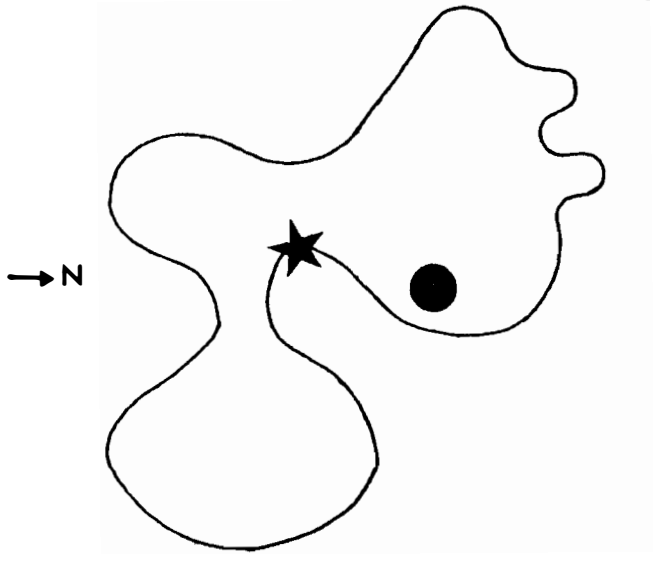
72 Birth lair +

M.H.-30
S.D.-55



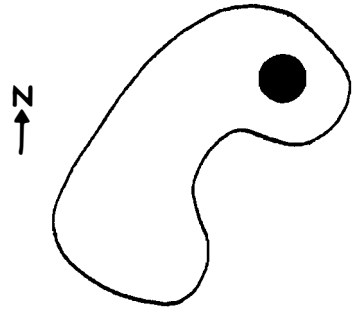
73 Birth lair

M.H.-30
S.D.-45



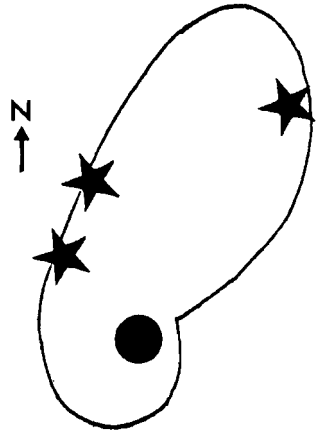
74 Birth lair

M.H.-40
S.D.-60



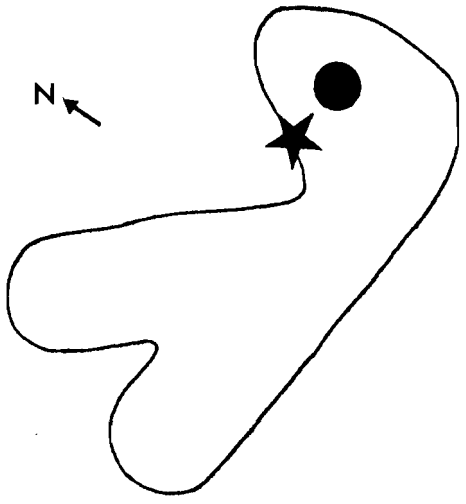
75 Tiggak lair

M.H.-20
S.D.-40



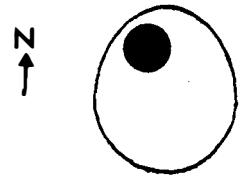
76 Indet.lair

M.H.-30
S.D.-65



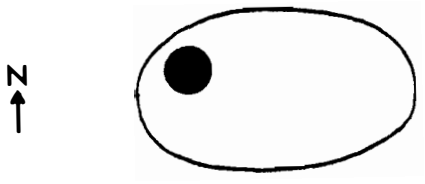
77 Indet.lair

M.H.-20
S.D.-60



78 Tiggak lair

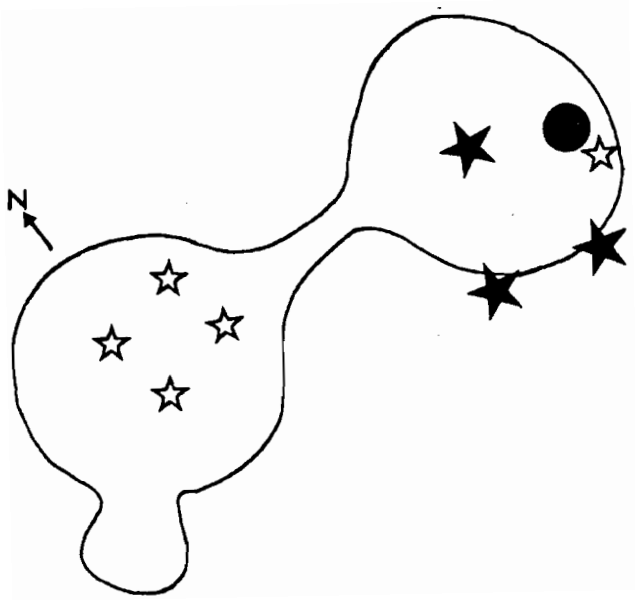
M.H.-40
S.D.-45



79

Indet.lair

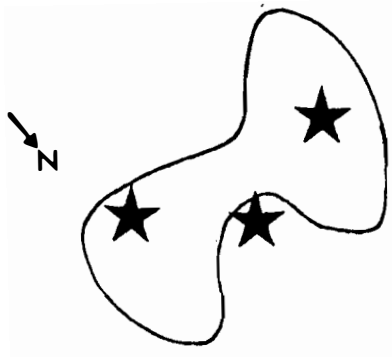
M.H.-40
S.D.-50



80

Birth lair

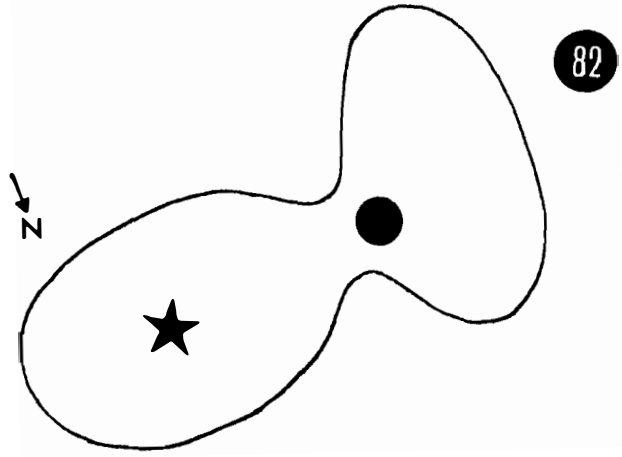
M.H.-15
S.D.-65



81

Indet.lair

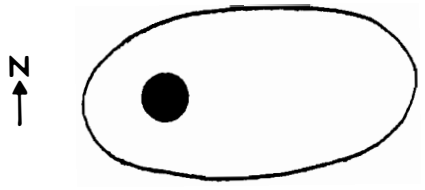
M.H.-30
S.D.-30



82

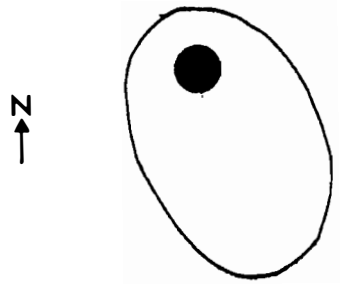
Tiggak lair

M.H.-35
S.D.-30



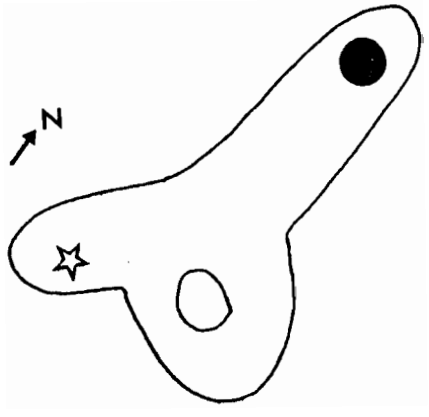
83 Tiggak lair

M.H.-35
S.D.-50



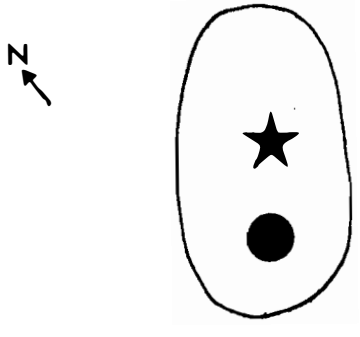
84 Indet.lair

M.H.-30
S.D.-25



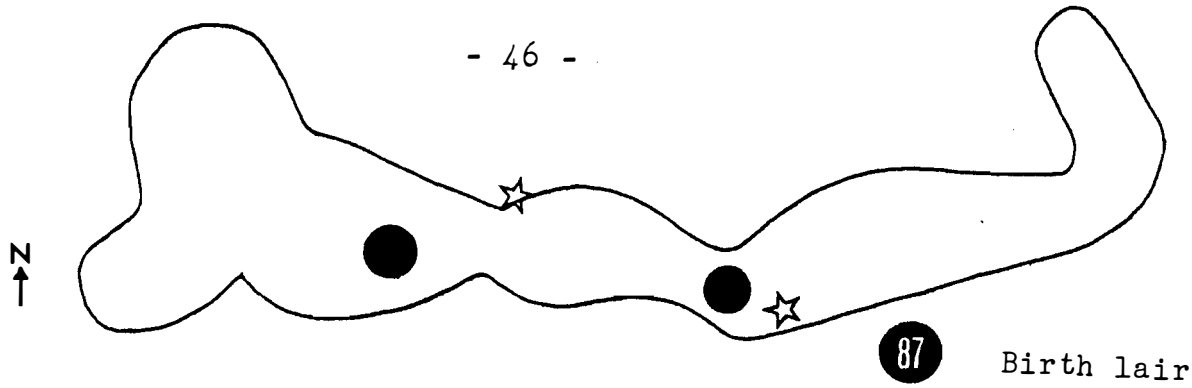
85 Birth lair

M.H.-35
S.D.-50



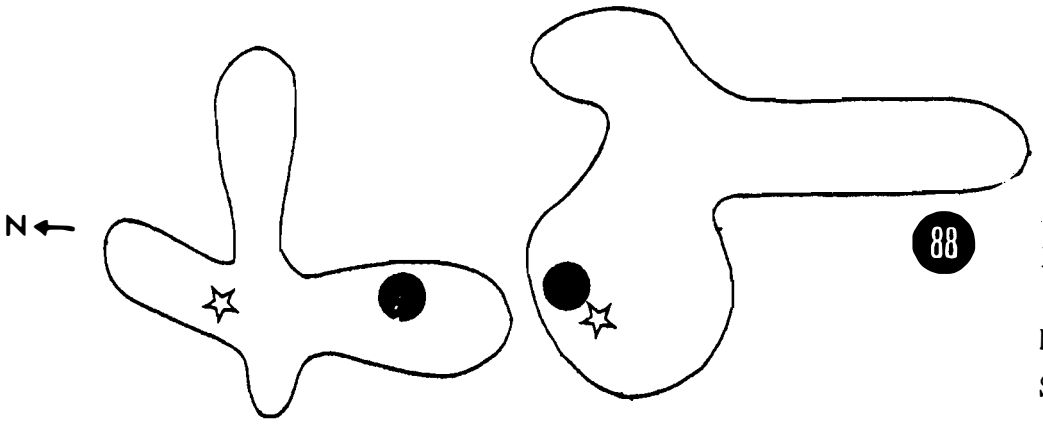
86 Tiggak lair

M.H.-50
S.D.-15



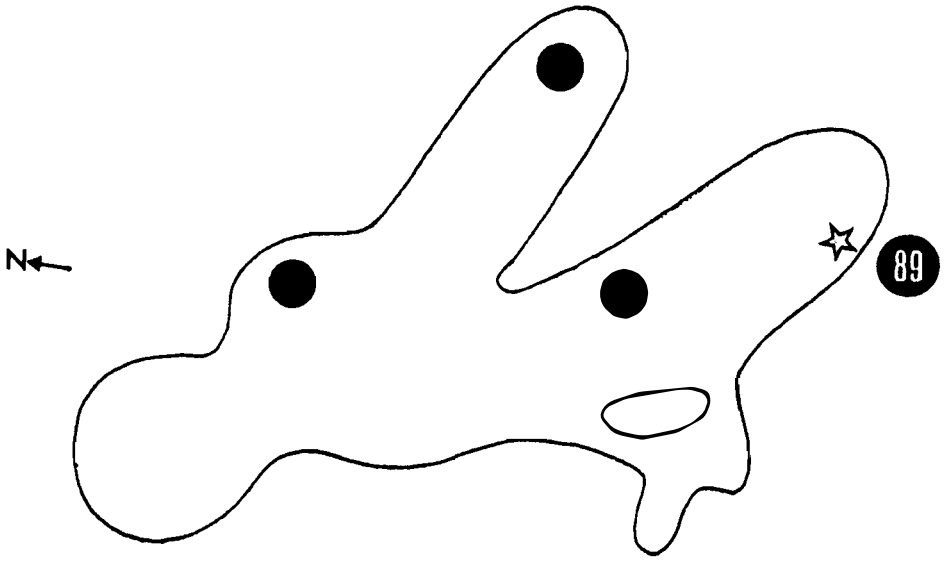
87 Birth lair

M.H.-35
S.D.-30



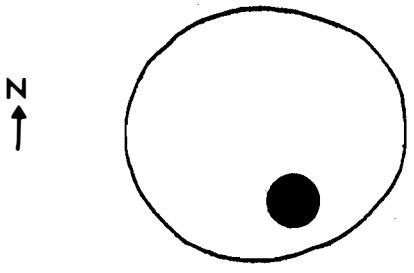
88 Birth lair

M.H.-25
S.D.-60



89 Birth lair

M.H.-30
S.D.-60



90 Indet.lair

M.H.-30
S.D.-35