

OBSERVATIONS ON THE HERPETOFAUNA OF SOUTHERN NORWAY (SØRLAND)

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This article deals with investigations carried out in the counties of Aust Agder and Telemark from 1991-1993. The majority of finds were made in the immediate vicinity of the town of Arendal and inland at altitudes of under approximately 300 meters. Journeys further inland and at higher elevations were carried out from time to time and the area covered in this report is presented in Figure 1. Figure 2 puts this region in perspective with the rest of the country. Arendal Kommune itself covers about 275 km² with 38,000 inhabitants. The offshore islands of Tromeøy and Hisøy have bridge connections to the mainland and the reptile and amphibian life of these two islands is also considered. Despite population expansion of recent years and the building of housing estates and individual private dwellings there has been little environmental destruction and woodlands, fields and marshes remain undisturbed. Farming is non-intensive. Hedges and ditches are preserved which form important sanctuaries for wild life. A combination of respect for animal and plant life and total protection of all species enables the herpetofauna to survive alongside man's activities. A few minutes car drive from the centre of Arendal town brings one out into the countryside and it is possible to walk considerable distances along footpaths and through the woods and forests, by the many lakes and streams in total solitude despite the fact that habitation is never far removed.

The total known content of the herpetofauna of Norway is presented in Table 1, together with that for Britain, Denmark and Sweden. This listing includes all species that have been recorded within the political boundaries of these countries which are known to be, or possibly are, native. It does not take into consideration the fact that in some cases distribution is very limited nor that there is a marked decline in numbers in the higher latitudes. As far as Norway is concerned documentation is poor. Both the Sand Lizard, *Lacerta agilis*, and the Natterjack Toad, *Bufo calamita*, are recorded from the Swedish side of the border with Norway in S.W. Sweden. It is probable that investigations will reveal the presence of these species in Norway. In the case of the Sand Lizard there have been important finds recently both in northern Denmark and Sweden (Manzke & Winkler, 1990). Although the Sand Lizard exists in the extreme north of Denmark it does not appear to have been successful in crossing what is now the Skagerrak and colonising the southernmost part of Norway. In Aage Wildhagen's article on the Common Lizard (Wildhagen, 1949) appear photographs not only of this species but the Sand Lizard too although the author does not distinguish between the two. These pictures were taken by the Danish photographer Hans Hvass, presumably in Denmark though this is unclear. It is not impossible that the Sand Lizard has already been observed in Norway but not identified as such. The Green Toad, *Bufo viridis*, can be termed an exotic species which has migrated from the east of Europe. This is known from the extreme south coast region of Sweden but does not appear to have made further inroads west and north. Much careful searching is clearly required in the "grey zone" on the fringes of the known ranges of these species to determine whether there might be penetration into Norwegian territory.



Fig. 1: o towns, villages, islands (upper case)

lakes and rivers (lower case)

■ altitudes in meters above mean sea level



Fig. 2: Map of Denmark and Scandinavia – Area Covered In Report Cross-Hatched

TABLE 1

	BRITAIN	DENMARK	NORWAY	SWEDEN
<i>Triturus alpestris</i>	-	+	-	-
<i>Triturus cristatus</i>	+	+	+	+
<i>Triturus helveticus</i>	+	-	-	-
<i>Triturus vulgaris</i>	+	+	+	+
<i>Bombina bombina</i>	-	+	-	?
<i>Pelobates fuscus</i>	-	+	-	+
<i>Bufo bufo</i>	+	+	+	+
<i>Bufo calamita</i>	+	+	-	+
<i>Bufo viridis</i>	-	+	-	+
<i>Hyla arborea</i>	-	+	-	+
<i>Rana arvalis</i>	-	+	+	+
<i>Rana dalmatina</i>	-	+	-	+
<i>Rana lessonae</i>	†	+	-	+
<i>Rana temporaria</i>	+	+	+	+
<i>Anguis fragilis</i>	+	+	+	+
<i>Lacerta agilis</i>	+	+	-	+
<i>Lacerta vivipara</i>	+	+	+	+
<i>Coronella austriaca</i>	+	?	+	+
<i>Natrix natrix</i>	+	+	+	+
<i>Vipera berus</i>	+	+	+	+

Symbols: + present - absent ? possibly extinct † doubtfully native

Sources: Arnold, Burton & Ovenden (1978), Mertens & Wermuth 1960), Steward (1969), Welch (1983) and others, see text.

Of the snakes all three species are found in all the countries listed though it is possible that the Smooth Snake, *Coronella austriaca*, is now extinct in Denmark. The Grass Snake, *Natrix natrix*, is no longer to be found in north Denmark. The massive destruction of natural habitat in Denmark and the agricultural policies of the European Community have probably much to do with this. Compared with Britain these two species fare much better, mostly for climatic reasons. Although the more northerly latitude means longer winters, and colder ones, this is not so significant as the benefit Norway receives in summer from the longer days and the continental aspect. Smith (1954) has demonstrated how the July 60°F (approximately 15.5°C) isotherm has its highest point on the eastern side of England more or less to Newcastle. On crossing the North Sea it turns smartly northwards to the southern point of Norway and runs well north to beyond 67°N in Sweden. Apart from the western seaboard of Norway all the country south of latitude 67° benefits from this condition in the summer. Thus it is that the Grass Snake reaches to about 65°N whereas in Britain it is not found north of the border. The Smooth Snake, as will be seen, is also helped by this factor of warm summers though in Norway its existence seems to be confined to the south which is about the same latitude as Aberdeen. On the Swedish Baltic

Coast it has been found nearly to the 65th. parallel, though this is admittedly an isolated record (Kauri, 1970). The mean temperatures of the summer months of July and August are as high in southern Norway as the south of England. Eastbourne with 242 hours of sunshine in June is bettered by the Norwegian south east coast which has in excess of 280. Even well inland the average is between 240 and 260 hours (sources Manley, 1952; the Norwegian State Meteorological Service).

Neither *Triturus cristatus* nor *T. vulgaris* have been found. Otherwise all species recorded from Norway have been observed and caught. Captured material has been released as near to the original finding place as possible.

SPECIES ACCOUNT

SALIENTIA

Bufonidae

Bufo bufo bufo (Linnæus). The Common Toad

To date only found in the immediate area of Arendal and inland at low elevations under about 150 m. Sometimes a road casualty. It is active by day even in the summer as on 21st June 1993 when a large adult measuring 95 mm was found at 18.30 in sunny conditions on the edge of a mown field. Another was found on a woodland path at 15.30 on August 7th. The Grass Snake feeds on toads and a 85 mm example was disgorged in fresh condition by a 90cm snake. I have searched for spawning sites in vain. Recently metamorphosed youngsters were found on August 10th 1992 in longish grass near a lake. On August 7th 1993 several babies were found in the same area along damp sections of a forest track flanked by shallow ditches. The Common Toad emerges from hibernation when the ground is still snow covered, pushing its way to the surface through the snow. This is pictorially displayed in Norges Dyr, 1992 edition.

Ranidae

Rana arvalis arvalis Nilsson. The Moor Frog

This species is known from the immediate coastal belt round the south of Norway. I have not identified this frog with any certainty but it is easily confused with *Rana temporaria*. Distinguishing characters, such as the more pointed snout and a greater separation of eye and tympanum, I have not found helpful since several examples found have one or other feature but not both. The Danish zoologist Liebekind writing in 1941 did not consider it to be a species separate from *R. temporaria*. Prevailing opinion today is that *R. arvalis* is a good species but there is no doubt that it is difficult to identify positively. Kauri (1970) suggests that the Moor Frog prefers a damper environment than the Common Frog and that ecological preferences serve to keep the two species apart in areas where they are sympatric.

Rana temporaria temporaria Linnæus. The Common Frog

Apart from some doubtful identification, see above, most frogs found have been assigned to this species. The Common Frog seems scarce near the coast but is occasionally encountered inland and at higher altitudes though generally singly or in pairs. Usual habitats are road ditches, small pools and damp woodland providing the tree cover is not too dense. It may be encountered in quite dry environments such as forestry tracks in partially cleared woodland. It is known from over 1000 m altitude. The highest personal record is a little over 500 m by Nesvatn in Telemark.

SAURIA

Anguillidae

Anguis fragilis fragilis Linnæus. The Slow or Blind Worm

This is the commonest reptile in the region. It occurs abundantly in the coastal and lowland regions, on the off-shore islands and well inland up to more than 500 m. It lives in both dry and damp environments but avoids dense woodland where the sunlight fails to penetrate. De-forested regions which have stood for a number of years with secondary vegetation taking over are also colonised to limited degree. It frequents roadside verges and is consequently often found as a road casualty.

Activity is mostly confined to overcast, sultry days and the evening when it is to be found roaming on shady paths and amongst vegetation. In lightly wooded areas it can be encountered at any time of the day and pregnant females will bask in the full summer sun. On the 23rd July 1993 I found two gravid females, one on a rock with heather clumps, the other in longish grass at around 18.00. With sunset at a little after 22.00 the sun was still powerful, air temperature 20°C. Mostly it is found in hiding under rocks, discarded rubbish especially sheet metal and less often under logs. The same hiding place may be used over a prolonged period and then abandoned. On the 15th August 1992 two Slow-worms were found under a rusty dustbin lid close to a rock outcrop in a field of long grass and bramble clumps. One of these was a male with regenerated tail. On the 22nd March 1993 this male was found under the same piece of metal on a day with the air temperature 7°C at 13.30. On the 11th April it was again in residence, 16.00 air temperature 6.5°C. but was absent on a revisit on July 24th. Weather conditions on the 22nd March were chilly, there was ice on puddles in the shade and yet the Slow-worm was quite active. Since it is inconceivable that it could have over-wintered with so little protection it must be assumed that it had come out of hibernation some days earlier and re-occupied its former haunt.

Both Smith (1954) and Street (1979) state that the blue spotted Slow-worm is not found in Scandinavia. This in fact is not the case. It was first found near Oslo in 1958 (Kauri, 1970) and since then in Sweden. I have taken two specimens, both males. The first was on May 17th 1993 on a shady woodland path. The ground was lead grey, spotted faintly with blue. The flanks pinkish, belly off white marked with dark grey on the midline, sparsely anteriorly developing into heavy black markings on posterior half. On the dorsum was a fine black dorso-lateral stripe and a light vertebral stripe. The ear cavity was indicated by a slight depression. Body length 200 mm, tail regenerated. The second specimen, found under a piece of metal sheeting on June 6th 1993, was a uniform dull medium grey with the blue spotting scattered but clear. This sloughed on June 9th and the blue spotting was brilliant in intensity. This had a body length of 220 mm, tail regenerated. Voipio (1956) remarks that blue spotting, which is confined to males, occurs in only 3.4% of material examined in Finland. Kauri (1970) remarks that this condition is extremely rare in Norwegian Slow-worms.

The largest female that I have measured had a body length of 180 mm, tail 160 mm. My two largest complete males were 200 mm body, 235 mm tail and 190 mm body, 220 mm tail. These were two of three found in hiding together under a piece of discarded roofing felt. The third, also male, had a body length of 220 mm, tail 150 mm regenerated. Smith (1954) gives the tail length in males as 55% of the total. This is the case in the two examples mentioned above which had a tail length of 54% and 53.7% respectively. The incomplete male would therefore, by extrapolation, have had a body length of close on 490 mm.

Lacertidae

Lacerta vivipara Jacquin. The Common or Viviparous Lizard

The Common Lizard is much less frequently encountered than the Slow-worm. Moreover it seems absent in the coastal region. Despite intensive searching of a wide range of biotope I have never found it. Whether this is the case elsewhere in the lowland littoral I cannot say. Inland over about 250 m the Common Lizard makes an appearance but never in large numbers. A particular site may support three or four individuals and one will then have perhaps to search a considerable area to find another population.

Essentially this lizard prefers a damp habitat. I have never found it far from water or marshy tracts. Grassy tussocks, brushwood and heather clumps are favourite basking places. I have also found it in quite shady woodland, but on the margins, and drier banks and rock piles. Higher up in the mountains at least up to 500 m this lizard displays similar habitat preferences. On 13th August 1993 at 510 m altitude above Nesvatn two juveniles were seen on the edge of meadows and at 340 m altitude close to Skrevatn two were found basking on a log in partially cleared forest in a brief interval of sunshine. Both these sites are a long way inland, over 100 km from the coast.

SERPENTES

Colubridae

Coronella austriaca austriaca Laurenti

This species is the least well known of the Norwegian snakes. The range, according to Street (1979) and Andren & Nilson (1992), is a belt round the coast from Oslofjord westwards to Stavanger. Kauri (1970) comments on the need for a warm and dry micro-climate. It has been doubtfully recorded from the Trondheim district but these records, made many years ago, Kauri regards as spurious. I was therefore surprised, while driving along the edge of Nesvatn in Telemark, about 100 km inland as the crow flies, to observe a Smooth Snake lying on the gravel road surface. This locality is about 510 m altitude and as far as I am aware this must represent the first find of this species so far inland at a relatively high elevation. The ability of the Smooth Snake to extend its range into the interior is probably dependant on it following the river valley systems. These do not exceed 300 m even considerable distances from the coast and have plenty of warm, protected sheltered areas which would favour this snake.

In contrast to Britain the Smooth Snake is to be found in a broader spectrum of ecosystems. I have found it on stone walls, open rock surfaces in open fields, light woodland, quite moist meadows and road verges. Street (1979) says that it is often found in hiding. This is not my experience in Norway. All my specimens have been found day active. The one I took on a stone wall on August 11th 1992 was lying in the full sun at about 17.00, air temperature 21°C. Despite searching under logs, stones and many pieces of corrugated metal sheeting I have never found it though two cast skins under one piece of metal indicated that this was probably a refuge place. It is normally a ground dwelling snake but there have been records made of it climbing into bushes and shrubs which is an attribute not usually credited to it.

The example I found inland, a male of 555 mm, was typically marked with a double row of chestnut bars down the back on a fawn ground. Those from the coastal zone had the bars single or double on the immediate anterior part fusing into dark

longitudinal stripes with a shadowy mid-lateral stripe and in one case, a female found killed, there were no barrings at all. All these snakes were quite dark and diffuse in overall appearance with the ground colour forming a lighter vertebral line. There was a deal of variation in the size and form of the head "coronet".

For details of size and scale counts see Table 2. It will be apparent that the Smooth Snake reaches a larger size than it does in Britain and the more southerly parts of its range. A particularly large specimen was caught by Frank Lunden from the Oslo district. This was officially measured by the Zoological Museum in Oslo and found to have a length, without stretching of 890 mm with a weight of 145 g. In 1957 an 825 mm specimen was taken near Tvedestrand, a few kilometres up the coast from Arendal (Kauri, 1970).

TABLE 2

A	B	C	D	E	F
Male	720	150	19	166	57
Female	680	105	19	183	44
Male	645	135	19	165	58
Male	630	140	19	154	57
Female	600	100	19	177	48
Male	555	115	19	172	57

Diagnostic data for *Coronella a. austriaca*

A sex B total length (mm) C tail length (mm) D dorsals E ventrals F subcaudals

The Smooth Snake is also found on some of the coastal islands. A baby specimen was found as a road casualty on Tromoy on September 1st 1991 and a smallish adult was observed but not caught on a woodland path in late April 1991. At one locality only about three kilometers from the centre of Arendal I have found the Smooth Snake sympatric with both the Grass Snake and the Adder. Here Slow Worms are particularly common and these feature as a main constituent of the Smooth Snake's diet.

Natrix natrix natrix (Linnæus). The Grass or Ringed Snake

On observations made in 1991/2 I came to the conclusion that the Grass Snake is rather uncommon in the area. In 1993 I have found it quite often in places that I have searched time and time again with no result. One example is a much used woodland path close to my home. This I have walked countless times without seeing any Grass Snakes. On April 30th in the early afternoon, temperature 19°C, a small specimen was found here on a heather/stony bank and on August 7th, two largish specimens were seen near the same spot on boulders beside the path. People speak of it as being fairly abundant and a farmer told me that he often sees Grass Snakes in a small brook on his land. It has been found as a road casualty on several occasions in the spring and early part of the summer (May and June particularly). Otherwise I have found it amongst brushwood and grassy banks. A pair were found in 1992 at a locality that I have kept under inspection for a long period. On August 12th

1992 two snakes were heard moving off into thick undergrowth. On returning about one hour later a female Grass Snake was caught as it lay basking. On August 15th careful searching disclosed the other snake well concealed amongst grass and undergrowth. This proved to be a male. Both were kept in captivity for a short period, the female especially remaining very aggressive, hissing loudly and striking out when any attempt was made to pick her up. The female measured 920 mm, the male 835 mm. The snakes were released on August 21st and on September 1st the female, which had now sloughed, was re-seen. This pair have not been found again in 1993.

Norwegian Grass Snakes seem to display aggression. I have only handled one that has "feigned" death and then briefly. One was caught in the grounds of the Zoological Gardens in Kristiansand and shown on national television. When approached it immediately adopted a defensive posture, striking out determinedly. This was practically a melanistic specimen. Many examples I have seen have been dark in colouring, often a dark olive-grey especially in females. Sometimes the colouring becomes nearly black against which the white or pale moon patches stand out in vivid contrast. Even on these dark specimens the ventral surface has the typical black/white checkered pattern. There are as a rule four rows of black spots dorso-laterally and laterally but these can be absent, the whole snake then being uniform. On one male I caught the belly was uniform dull white with a black stripe down the mid-line. Occasionally one finds Grass Snakes with a zig-zag dorsal pattern resembling the Adder. These are known from Sweden and other places in eastern Europe (Street, 1979). I have observed one such example which unfortunately escaped.

The largest example I have measured totalled 970 mm, a road casualty. The largest known Norwegian example comes from Mjåvatn a short distance inland from Arendal. This was found on May 1st 1957 and measured 135 cm. Stories of Grass Snakes of quite fantastic size from Aust Agder have been collected by Arne Mjåland from Birkeland. These were published in the regional newspaper in 1992 and refer to snakes in excess of 3 meters. Distrustful though one may be of such reports there is good evidence that the Grass Snake can reach impressive dimensions. Kauri (1970) gives details of what must be the largest Grass Snake unofficially recorded in Scandinavia. Even though the example had to be released and not accurately measured the credentials of the finder are impeccable. This refers to an encounter in Sweden. Henry Norling was a railway employee and amateur herpetologist with a special interest in the Grass Snake:

"I was driving a rail tricycle between Jarna station and Södetalje on the 11th July 1959. . . . when I saw a snake crawling under the tracks, spanning both of the rails. I reckoned its length to be therefore about 175 cm. It was as thick as a 1kg eel, completely black with no markings. I got hold of it just behind the head and standing upright and holding it against me its tail was still well on the ground. My height is 186 cm. It hissed and bit me twice on the left hand. I changed my grip and was bitten twice more. The skin was bruised and torn and bled somewhat. I tried to get the snake into my lunch box; this was unsuccessful for I had no sooner got some of the coils in the box than the first one or two came out again. In the meantime I was bitten five times more on my right hand . . . I am probably stronger than most people but I couldn't manage to control the snake. I have caught snakes which measured 116, 120 and 126 cm but they were small compared with this. I was forced to release it after half-an-hour because I had nothing I could keep it in."

(Author's translation).

This snake must have been over 200 cm long since it is unlikely that it hung straight down without some bends in the body.

Arne Mjåland's collection of tales (all interestingly enough from a small area not far from Arendal) stretch the imagination considerably but there is one which has to be taken seriously since the person concerned claims he measured the snake and there is no evidence to suggest other than it was a factual encounter. Tengel Sunde, also coincidentally a railway employee, killed a huge snake in September 1949 about one kilometer east from Hynnekleiv station:

"I was working on the railway track when I saw a snake lying on the hillside in the proximity of the line. I couldn't see the entire snake as it crept under a slab of rock about two meters in length. I cut off a branch from an oak tree and attacked the snake. The snake then came at me so I was forced to retreat but eventually killed it. It proved to be a terrible monster. I measured it and found it to be 371 cm long and as thick as a beer bottle. The head was as big as a grown man's clenched fist. My work mates reckoned it must have escaped from a circus because they couldn't believe that there were such huge snakes in Norway. I killed it because this was a place where people come to pick berries and I was afraid that they would come across it."

(Author's translation)

Well, perhaps large snakes like railway lines! Although one must admit to being sceptical that *N. natrix* could reach such a huge size it is known that both the Four-lined Snake (*Elaphe quatuorlineata*) and the Montpellier Snake (*Malpolon monspessulanus insignitus*) from the Attica region of Greece attained lengths many years ago of close on 300 cm since there is preserved material in Athens to prove it. Achilles Dimitropoulos, with whom I have discussed the matter, remarks that the vastly increased road traffic and of course the urbanisation of Attica reduced the growth potential of these species since many would fall victim to man's activities. To find either of these species today even as much as 200 cm in length is a rarity. With a proven length of over 200 cm *Natrix natrix* could in favourable circumstances grow even larger and Norway remains, as has been stated, relatively well preserved with regard to natural landscape, its forests, moors, marshes and wild tracts.

Viperidae

Vipera berus berus (Linnæus). The Adder or Common Viper

This is the commonest and most widely distributed of the three snake species. It occurs up to at least 1000 m and in a variety of habitats often occurring on the edge of fields, woodland, road sides and in agricultural areas as well as entering gardens. It receives a good deal of attention through the journalistic media. Since, like all wild life, it is protected by law it is seldom killed and the most usual reaction to its presence round houses and gardens is how to deter it or remove it. Suggestions have varied from moth balls, paraffin or diesel fuel where they like to lie basking to filling one's garden with families of hedgehogs! Despite its apparent frequency accidents seem rare. There was a case recently of a 9-year old girl being bitten while picking wild strawberries. She suffered a badly swollen leg with considerable bruising but was fully recovered after a few days in hospital.

Like the Common Lizard the Adder occurs in some places but not others and is most definitely colonial. One can search extensive areas of countryside and not find it at all. Two localities close to where I live have permanent populations of adders which I am able to visit regularly during the course of the active season. Details on observations made on these snakes is not presented here since it is intended to carry out longer term research. Otherwise I have found it well inland and, like the Grass Snake, is to be found on country roads where I have encountered it both dead and alive.

The active season is longer than one might expect from the latitude though the mild winters of recent years have probably contributed somewhat. The final sighting I made in 1992 was on October 6th at one of the two sites mentioned above which is situated on the edge of a roundabout on the busy E18 route from Oslo to Kristiansand. A small copse adjoins the road on one side and is surrounded by meadows on the others. There are deep rocky clefts and boulders and is a hibernation retreat though the estimated population does not total more than four or five individuals as far as I have been able to determine. The adder in question was a melanistic male about 60 cm long. The air temperature was about 10°C and the snake had chosen a warm protected spot to bask. Visits were undertaken daily until October 13th. Despite maxima temperatures of over 10°C (17°C on the 7th) no further sightings were made and the weather then became abruptly wintry with night frosts and sleet. In the middle of February the weather turned mild and the hibernation locality was checked with negative result. A snowy period followed at the end of the month but March 7th was mild (8°C) and sunny. A visit on this date also proved negative. Thick snow still covered the fields and the lakes were frozen. Though mild the weather continued mostly cloudy until the 16th and on this date was made the first sighting of *V. berus*. Fortuitously this was the same individual seen on October 6th. Although it cannot be certain that the snake had emerged from hibernation on March 16th it cannot have been out of its winter quarters for more than a day or two. This gives a hibernation length of about 160 days. Smith (1954) gives a hibernation period of between 140 and 150 days in Denmark and Britain. Street (1979) quotes Prestt (1971) who states that in Dorset the males hibernate for about 150 days and the females 180. It would seem that at least in the relatively mild and protected southern part of Norway adders have an active period similar to Britain despite the longer winter season. Inland too *V. berus* is known to make an early appearance. A most interesting article appeared in *Agderposten* on March 29th 1993 entitled "Hoggorm på snø" (Adder on the snow).

The encounter place high up in the mountains towards the end of April, year not stated:

"I was skiing on the snow-covered plateau in the mountain region between Valle, Tokke and Fyresdal. The sun was blazing from a cloudless sky, soon it would be May, soon summer. Everything was tranquil and warm. The snow was lying about a meter deep but the streams were open and the bogs and marshes softening. Round the birch groves and willow scrub the snow was thin and patchy but there was still plenty of deep snow here 800 m up. Suddenly I saw something long and dark which disrupted the harmony of the snow surface. It is neither a twig nor a branch being too supple in form. Could it be a snake, a snake on the snow? I walked over to the "twig". The forked tongue which flickers leaves no doubt that it is a snake. A fully grown adder, the zig-zag marking clearly visible. This specimen is probably about 70-80 cm long. A large adder, one of the biggest. I snapped a couple of pictures and left it in peace. It will have a hard time of it when the evening chill sets in. We both slide on our way, the adder and I." (Author's translation)

The article is accompanied by a photograph. Apart from the somewhat lyrical description of the incident there is much of interest here. From the indicated size, albeit approximate, the snake must have been a female and the circumstances demonstrate how mountain adders utilise the warmth of the spring sun to take advantage of as long an active season as possible. The lowest temperature in the spring that I have found it active was about 6.5°C (April 11th 1993).

Adders in Norway and elsewhere in Scandinavia reach a larger size than in Britain. Males often attain 600 mm, the largest that I have measured, caught inland at about 500 m, totalled 635 mm. Females regularly exceed 650 mm, my four largest being 670 mm, 750 mm, 770 mm, 810 mm. Wildhagen (1949) reports that the largest adder examined by a Norwegian museum was 765 mm. Kauri (1970) states that 800 mm is not so unusual. The Oslo Zoological Museum has one from Jeloy in Oslofjorden that was 825 mm when alive, 810 mm after some time in spirit. Kauri also reports that large adders are found in the mountains where they can reach 820 mm, as from the Hardangervidda National Park at Haugastol, over 1000 m altitude. In the north of Sweden a length of 104 cm has been recorded, (Gislen and Kauri, 1959).

Melanistic adders occur more frequently than normally coloured individuals. Of 25 adults snakes caught or observed in the lowlands and moderate altitudes, under 300 mm elevation, 60% were black either wholly or partially. The degree and intensity of the black pigment varied. Some were a rich, jet black with the lip shields white edged, on others the colouring was more of a very dark ash-grey against which the zig-zag marking was just visible on close inspection and was sometimes more distinct than others. One female was a beautiful dark smokey grey with a bluish tint. The melanistic condition was roughly equally divided between males and females where sexing was possible. On the 40% which could be described as "normal" there were a few on which the ground colour was much reduced (four males, one female). Three males had the vivid contrast between brilliant silver-grey ground and deep black zig-zag which intensifies in the breeding season. Of the total of ten "normally" marked individuals eight were males. Two adders taken inland at over 500 m altitude, a male and a female, showed no sexual dimorphism, both being yellow-brown with a dark brown zig-zag, ventral surface black tail tip sulphur-yellow. Whether melanism is confined to lower altitudes and is absent or rare in the mountains has not been determined. Winkler (1991) has observed a relatively high proportion of melanistic adders in a study of amphibians and reptiles on the Swedish island of Öland. Melanism develops gradually during the first three or four years of life, the young on birth being brown with a darker brown zig-zag. However of a group of four recently born babies seen on August 12th 1992 one was a deep smokey grey with black zig-zag and two were dark brown with black zig-zags. A two year old adder found on September 18th 1992 was refound on August 20th 1993. This was typically coloured in 1992 but a year later was much darker in colour and showing the development of melanism. It was found at precisely the same location.

CONCLUSION

This report represents a first stage in the cataloguing of information on Norwegian amphibians and reptiles by the author. It appears that little detailed research has been carried out in Norway and that there is plenty of scope for making valuable contributions. This can be broken down into three main areas:

1. distributional records of known species especially in the higher altitudes and on the margins of what is the officially accepted range parameters.
2. more intimate research into the life cycles of certain species such as *V. berus* and habitat preferences of *C. austriaca* which seems to display a greater tolerance of climate and biotope than is normally attributed to it.
3. to establish whether *L. agilis* and *B. calamita* are to be found in Norway and if so their extent of penetration into the country.

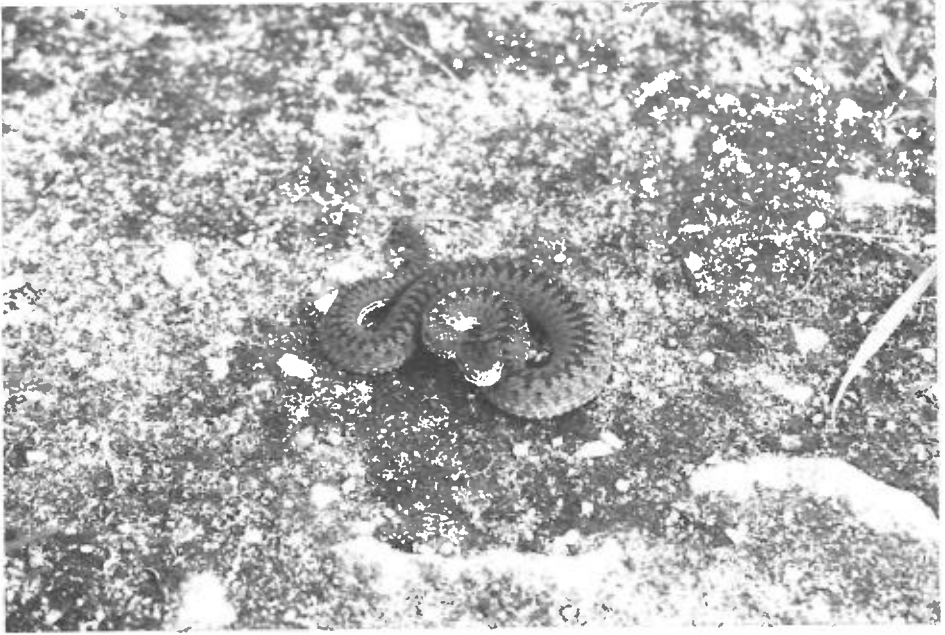


Plate 1: New-born *Vipera berus*



Plate 2: *Coronella austriaca* 55.5 cm male from Nesvatn



Plate 3: *Coronella austriaca* 64.5 cm male from Arendal

It is intended to pursue these investigations in the years to come as time allows. Norway is strongly recommended to all readers as a country to visit with the opportunity of observing the herpetofauna in unspoiled environments often set against great natural beauty.

APPENDIX

Some knowledge of the Norwegian names for the various amphibian and reptile species could be useful for the visitor to Norway interested in observing the herpetofauna.

Scientific	Norwegian
<i>T. cristatus</i>	Stor salamander
<i>T. vulgaris</i>	Lite salamander
<i>B. bufo</i>	Padde
<i>R. arvalis</i>	Spissnutet frosk
<i>R. temporaria</i>	Vanlig frosk, buttsnutet frosk
<i>A. fragilis</i>	Stålor, blindorm, kopperslange
<i>L. vivipara</i>	Firfisl
<i>C. austriaca</i>	Slettsnok(g), slettorm
<i>N. natrix</i>	Buorm
<i>V. berus</i>	Hoggorm

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