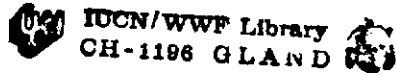


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Josef Kratochvíl and others

HISTORY OF THE DISTRIBUTION OF THE LYNX IN EUROPE

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Abstract

On behalf of the *International Union of the Conservation of Nature*, the *World Wildlife Fund* promotes the elaboration of a Report on the present status of scarce and endangered species. Several important species of large mammals, including the lynx (*World Wildlife Project No. 56*), are endangered in Europe. The proper Report on the hitherto distribution of the lynx in the European countries in which it still occurs will be the subject of the next volume of this journal. In the first volume, the process of disappearance of the lynx is drawn in general; the latest occurrence of this carnivore is evidenced in those countries in which it had been extinct (J. Kratochvíl); changes in the area of its distribution in Europe are described (N. K. Vereščagin, S. V. Kirikov). We are relatively well informed on the process of disappearance of the lynx from W. Europe, especially in France, as summarized in a paper (by M.-Ch. Saint Girons) in this report. In this volume, the process of disappearance of the lynx in S. Europe is illustrated in the papers by A. Toschi and N. Atanasov, and in C. Europe in those by J. Kratochvíl and F. Vala. The reasons are discussed of the extermination of the lynx in the cultivated areas of many European countries, as well as the possibility for its conservation in countries of its present occurrence.

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Preface

In Europe, the process of disappearance of the lynx has been in progress for four centuries, going in the direction from west to east. This process was particularly marked during the past 150 years. The disappearance of such an important carnivore from the fauna of a major part of Europe and the menace of its extinction in many other European countries are of great cultural and practical importance. This problem was dealt with by the *Survival Service Commission* in Warsaw in 1960. On behalf of the *International Union of the Conservation of Nature*, the *World Wildlife Fund* proposed elaboration of a report on the present state of scarce and endangered species. As far as the lynx in Europe is concerned, this task is registered under the *World Wildlife Project No. 56*.

I was asked by Dr. A. van Wijngaarden (in his letter of December 16, 1963) to take up this Project. I accepted this task and after having examined the problems, the whole study on the lynx in Europe split into two parts, each of which will be the subject of a volume of this journal:

(1) To get acquainted with the history of disappearance of the lynx in those parts of Europe in which it had been extinct in the past. To find out reasons for its extermination. To ascertain the available scientific materials on the extinct population of the lynx in different countries of Europe. To ascertain whether the lynx is able to repopulate those territories in which it had been extinct and under what conditions this would be possible. These problems are demonstrated on examples from several countries. In S. Europe, we selected Italy and Bulgaria; in C. Europe, Bohemia and Moravia; in W. Europe the problem of the extermination of the lynx has been best elaborated in France. Only a rough outline is given of the situation in other countries with regard to the possibilities of this journal. In our opinion, this way of treating our problem can provide a sufficiently clear idea of the disappearance of the lynx from certain European countries and stimulate the examination of this problem in those countries where it has not yet been tackled.

(2) To get acquainted with the present distribution and population density of the lynx and the degree of the menace and conservation of the lynx in those countries of Europe in which it still occurs. The problem was worked out in detail in the areas where sufficient data are available; where they are scarce or where the problem of the lynx had been treated in a congress language, our reports are more concise. The Spanish lynx (*Lynx pardina*) will be treated later on by the Spanish authors.

I have found it necessary and useful to work out both groups of problems outlined above. History shows us errors committed by our ancestors, and we have to avoid them. The knowledge of the status quo, again, indicates the possible way of reaching the appointed goal. Europe belongs to the foci of the world culture and the extermination of such an important species as the lynx would be a negative feature in the cultural treasure of Europe.

I have considered it useful that authentic material on the occurrence of the lynx should be gathered and, if possible, also evaluated for the purpose of the present study by a native scientist of each country. There are very few exceptions and, even in these cases, the manuscript was read by a specialist of the respective country, to secure the maximum reliability.

It is my pleasant duty to thank in this place all those who kindly submitted to me valuable data and information. My special thanks are due to Messrs. Academician G. Kolosváry (Szeged), Dr. J. Szunyoghy (Budapest), Dr. A. Keve (Budapest), Director S. Palásthy (Sárospatak), Custodian Dj. Mirić (Beograd), Ing. H. A. Almāsan, (București), Dr. J. A. Valverde (Almería), Prof. Dr. H. Kahmann (München), Dr. Ing. K. Bauer (Wien). I am particularly indebted to all joint authors: Dr. M.-Ch. Saint Girons (Brunoy, Essonne), Prof. Dr. A. Toschi (Bologna), Dr. N. Atanasov (Sofia), Dr. S. Myrberget (Vollbekk), Dr. K. Curry-Lindahl (Stockholm), Dr. E. Pulliainen (Helsinki), Prof. Dr. G. A. Novikov (Leningrad), Dr. N. K. Vereščagin (Leningrad), Prof. Dr. A. Haber and Ing. J. Matuszewski (Warszawa), I. I. Turānin and I. I. Kolušev (Užgorod), I. V. Kirikov (Moskva), Ing. P. Hell (Nitra).

My special thanks are due to Dr. A. van Wijngaarden for the confidence which he expressed on behalf of the *International Union of the Conservation of Nature* in charging me with the elaboration of the *World Wildlife Project No. 56*.

I am much obliged to Dr. Z. Feriancová (Bratislava) and Ing. J. Sládek (Zvolen) for valuable comments on the manuscript.

I am also very grateful to Ing. Dr. R. Obrtel (Brno) and to Mrs. J. Hobstová (Brno) for their linguistic collaboration, as well as to Mr. M. Opluštil, who prepared the illustrations for printing.

The organization of the whole work, collecting and editing the papers lasted three years, so that our report reflects the situation towards the end of 1964. This fact does not reduce the importance of our work, as the following years have confirmed our conclusions. Last but not least, the fact ought to be emphasized that the whole report is a result of collaboration among 16 nations of Europe.

J. Kratochvíl

Survey of the Distribution of Populations of the Genus *Lynx* in Europe

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At present, various opinions are supported on the value of a biologic species in mammalogy. Some scientists are inclined to group several forms, even of different taxonomic values, into a single "large species". Others divide the same forms into many "small species", being inclined to consider a species to be a unit of very close and innerly unseparated populations among which there is no sexual separation in free nature. This very difficult problem is being gradually elucidated, as the value of individual taxons is more and more frequently estimated not only on ground

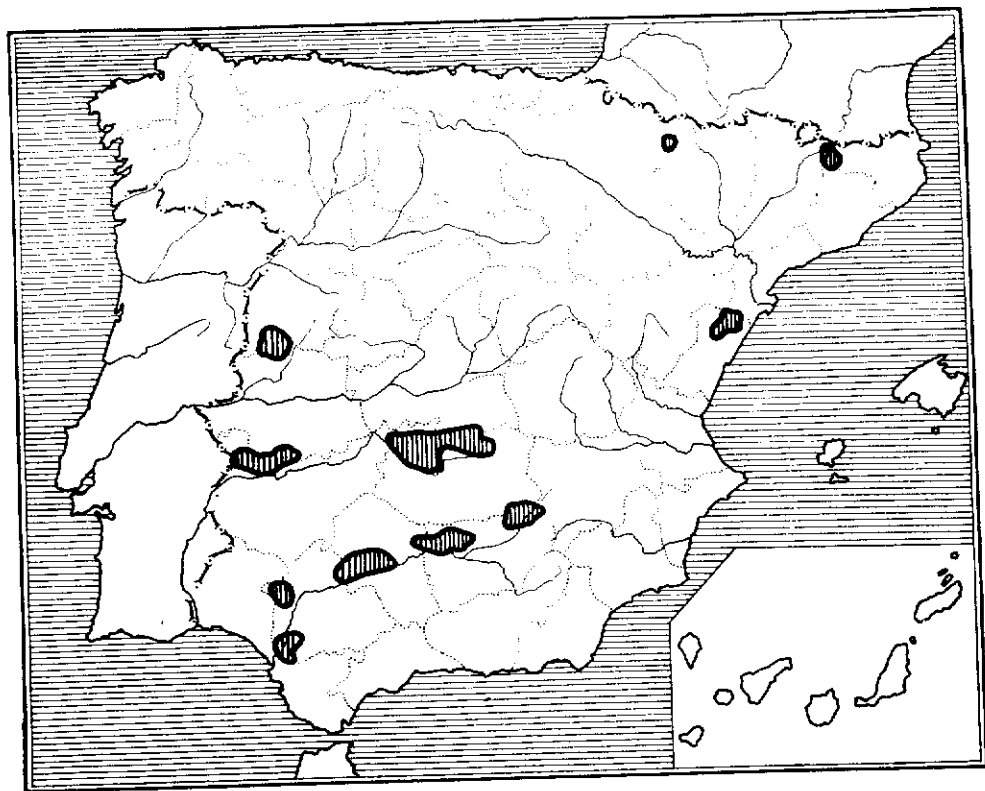


Fig. 1. Recent distribution of the Spanish lynx, *Lynx pardina* (Temminck, 1824), according to its population density in 1963. According to J. A. Valverde (1963).

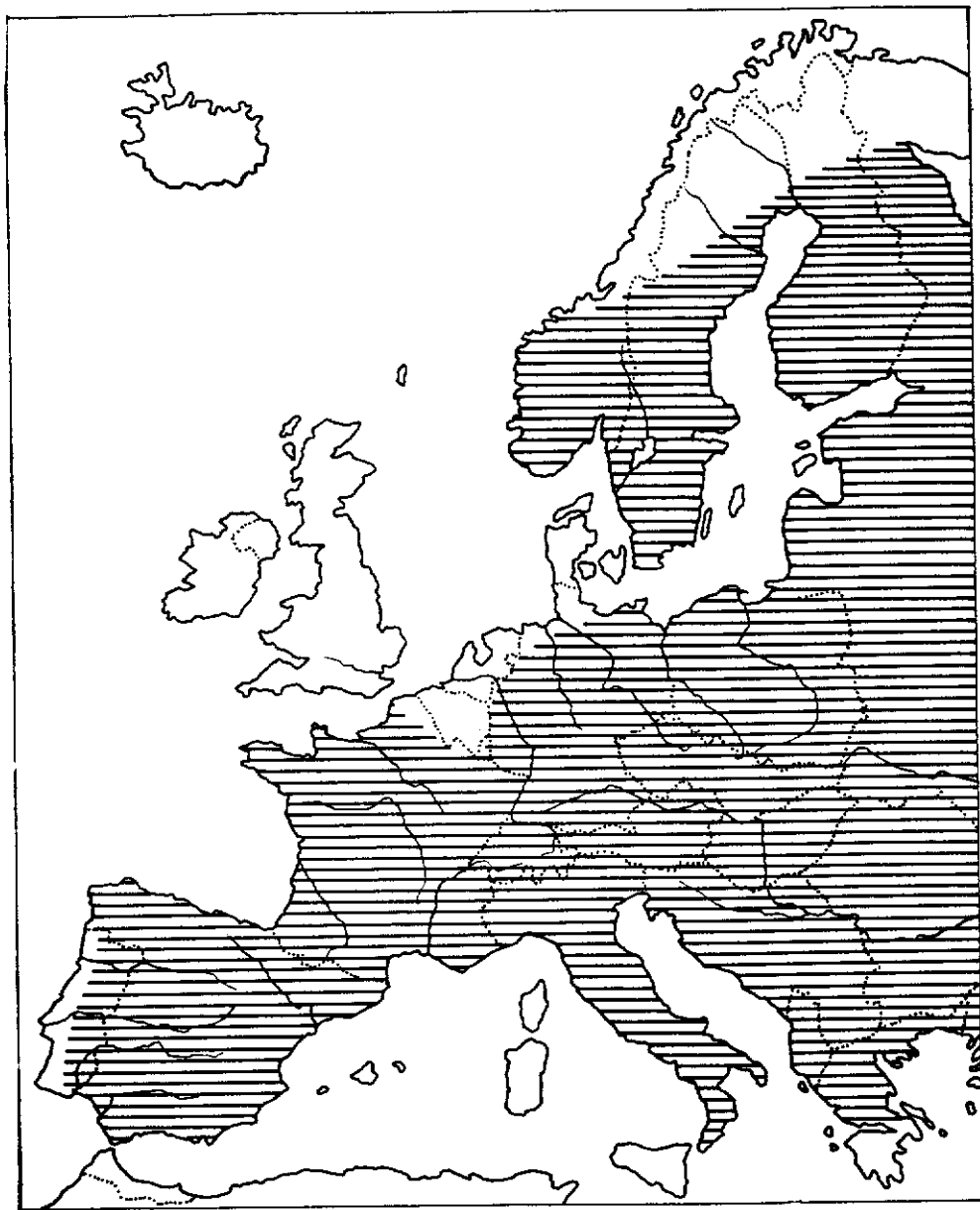


Fig. 2. Presumed distribution of the lynx in Europe in the beginning of the historical period.
Original.

of outer morphological criteria (which need not express, in adequate measure, the degree of inner differentiation) but also on ground of cytological, ecological and biochemical criteria.

As far as the members of the genus *Lynx* Kerr, 1792, are concerned, their specific classification has not yet been elucidated. Their present state in Europe is as follows: The forms inhabiting the extensive territories of the European continent are classified

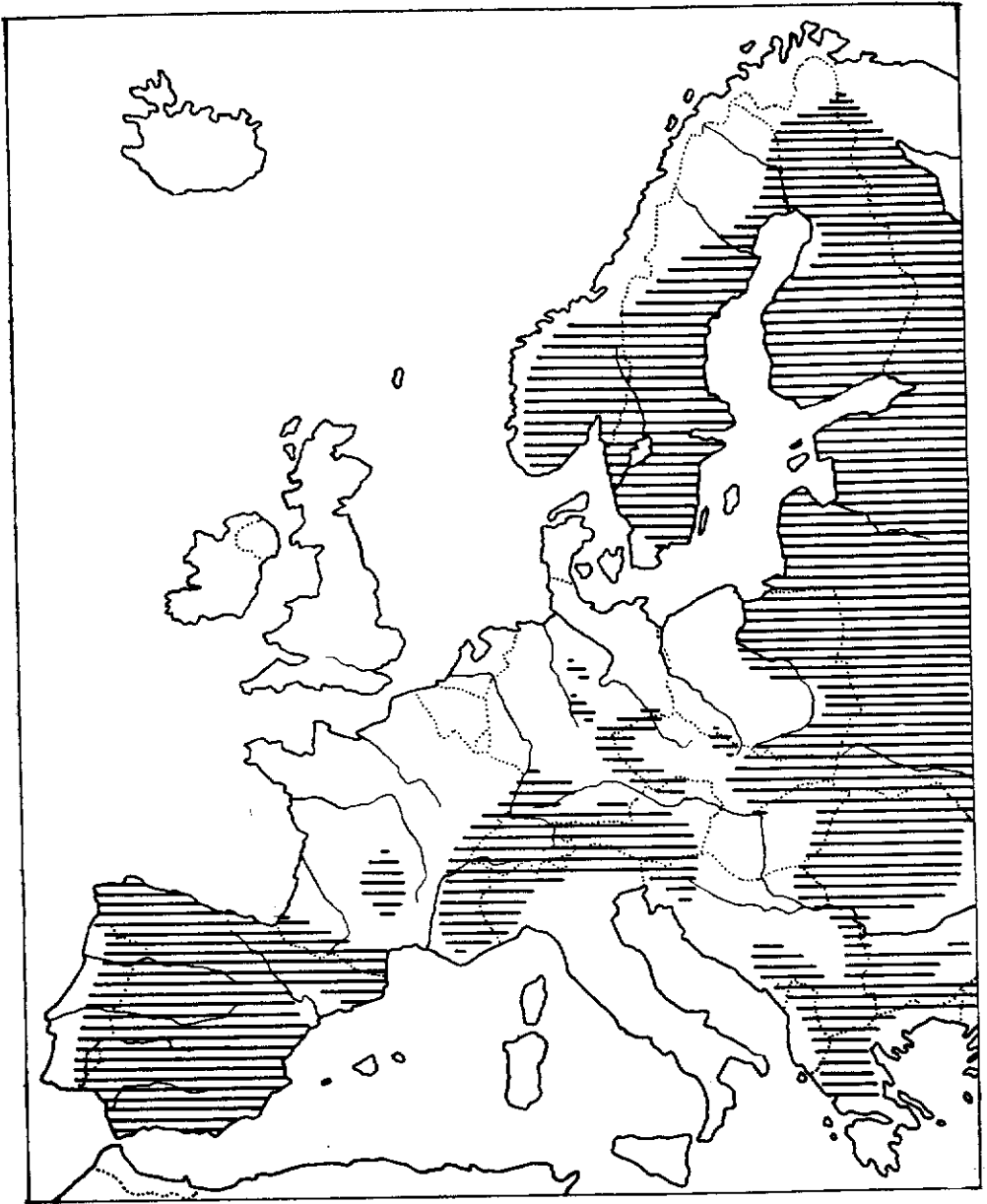


Fig. 3. Distribution of the lynx towards 1800.
 Compiled and completed by K. Curry-Lindahl (1951).

under the species *Lynx lynx*. The populations inhabiting the Iberian Peninsula are classified as *Lynx pardina*. Recently, some specialists have included all the European populations of the genus *Lynx* in one species, *Lynx lynx*; on the contrary, some others refer to more than two species. In the set of papers forming the contents of this report, taxonomic problems are not discussed; for practical reasons, the opinion has been adopted of those specialists who distinguish two species in Europe:

(1) The Spanish lynx, *Lynx pardina* (Temminck, 1824), which inhabited areas distant from centres of human population all over the Iberian Peninsula some fifty years ago. The present situation is shown in the attached map (Fig. 1) adopted from the paper by J. A. Valverde (1963). The existence of this lynx is undoubtedly endangered and the struggle of Spanish specialists for its recovery should be highly appreciated. This species does not occur in other parts of Europe as had been generally believed and even noted by Brink still in 1957 (p. 131), 1967 (p. 139). Bureš 1941, Ondrias 1967, Atanasov 1968 and Toschi 1968 unanimously show that *Lynx pardina* has never occurred in Italy and in the Balkans. Călinescu 1913, Sládek et al. 1963, Štollmann 1963, Vasiliu et Decei 1964 demonstrated that this species has never inhabited the Carpathians.

(2) The Common lynx, *Lynx lynx* (Linné, 1758) was distributed all over Europe from the north down to the Mediterranean and the Black Sea with the exception of the Iberian Peninsula (Fig. 2). It seems to have had this distribution still in the Palaeolithic Period, i. e. some 10,000 years ago. Curry-Lindahl suggests that its extermination in the British Isles could have been due to the Atlantic climate among other causes. At any rate, in the coastal areas of Norway the lynx has always been scarce even when its numbers were satisfactory in the inland of Scandinavia (Collet 1912, quoted by Curry-Lindahl 1951). This is supported even by the situation having existed in the historical period, in Denmark, Holland and Belgium (and maybe even in the coastal parts of France and Portugal). Nothing is known on the occurrence of the lynx in Holland in the past, as evidenced by P. J. van Fee (Curry-Lindahl 1951). Similarly, S. Frechkop (Curry-Lindahl 1951) communicated that only some places were known in Belgium where the remains of lynxes from the prehistoric era had been discovered. In the historical period the lynx did not inhabit Denmark any more. The Danish authors, as mentioned by Curry-Lindahl (1951), report on Bronze Age findings of the lynx in Jylland and Sjaeland. It is probable that the lynx did not inhabit the Atlantic coast of Germany in the historical period.

In other countries of the western part of Europe the lynx survived longer. In several areas, local populations of the lynx survived up to the beginning of the 19th century (Fig. 3). The present state is shown in the attached map (Fig. 4). Even when the situation grew better in the last decennia (due to protection of lynxes in some countries, this largest European feline carnivore is still endangered in many countries of its occurrence.

A brief outline of the extermination of the lynx in France is given by Mme M.-Ch. Saint Girons in this volume. The lynx does not seem to occur even in the French Pyrenees any more. The find published by Beaufort in 1965 is not convincing. Exhaustive data on the disappearance of the lynx in Italy are presented by A. Toschi in this volume. South of the Po Lowlands the lynx was extinct in the historical period and no specimens evidencing its existence there can be found in the museums. In the Balkan Peninsula, the lynx was exterminated in Bulgaria, as reported by N. Atanasov, and in the whole central and northern part of Yugoslavia. The lynx is still inhabiting the northernmost part of Greece (Ondrias 1967) and the southern part of Yugoslavia, mainly the western area of Macedonia, as shown by J. Kratochvíl in the second volume of the present report. It is probable that the lynx still inhabits the mountainous areas of Albania neighbouring with Macedonia and Greece.

In C. Europe, the lynx survived only in the Carpathian area, as will be shown in the papers by P. Hell, A. Haber and G. Matuszewski, I. I. Tur'anin and I. I. Kol'ušev, and in those by J. Kratochvíl in the second volume of our report on the lynx. In other parts of C. Europe the lynx was entirely exterminated. In the countries of C. Europe, the process of disappearance of the lynx lasted four

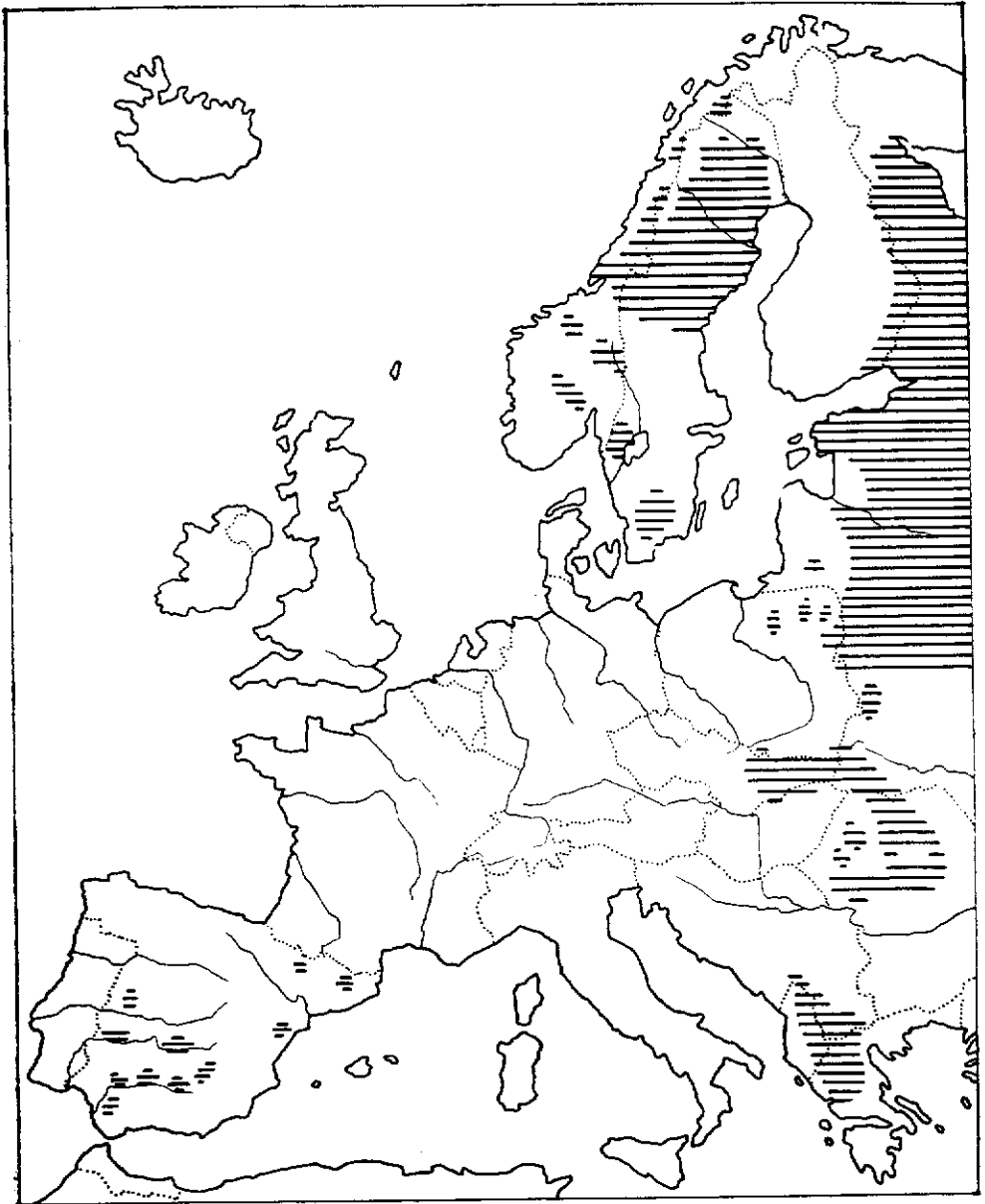


Fig. 4. Distribution of the lynx towards 1960. Original. Compiled from various maps of the following authors: Myrberget (1968), Curry-Lindahl (1958), Pulliainen (1968), Novikov (1968), Haber and Matuszewski (1968), Hell (1968), Valverde (1963), Vasiliu and Decei (1964), Kratočvíl (1968).

centuries at least. The lynx survived the longest in the Alps. In Switzerland, the lynx was a common animal even in the beginning of the 19th century. Towards the middle of the 19th century only one individual was killed yearly throughout Switzerland and during the second part of that century the lynx was already very scarce even there (Guggisberg 1955). A young lynx killed near Brigne (Wallis) in 1902 is reported

to be the last record of the lynx in Switzerland. The specimen is deposited in the Musée de Genève. According to other sources a lynx hunted at Sent in Val Uina in 1872 (Guggisberg 1955) is supposed to be the last Swiss lynx. In fact, it has always been very difficult to determine what is really the last evidence of the existence of an extinct local population and what is a stray animal coming from countries where the lynx is still frequent. It is evident that more recent news on the occurrence of the lynx in Switzerland are not based on any evidence (e. g., the report on killing of a lynx in the area near the Simplon Pass in 1909). Such reports pertain to stray animals at most. In the same way it is necessary to evaluate the reports on the occurrence of the lynx in Switzerland after World War II (Schmidt 1960).

In the lowlands of Austria the lynx was extinct a long time ago. In the Austrian Alps it was entirely exterminated towards the end of the 19th century, *i. e.*, sooner than in the Italian and French Alps (Hainard 1949). The lynx used to be a very numerous species in Austria. It is evidenced by a report on the capture of 654 individuals between 1521 and 1589 (Bley 1936). In Tirol and Vorarlberg, the lynx caused great damage to sheep prior to 1872, but towards the end of the 19th century the lynx did not belong to standing inhabitants of Austria any more. The individual taken in 1892 is considered to be the last lynx of Styria (Guggisberg 1955). Some strays were seen in Austria even later. *E. g.*, a lynx was ascertained in the environs of Ybbs in Upper Austria in 1902 (Floericke 1927). Even after World War II, traces of lynx activity were ascertained in Austria (Schmidt 1960 and written communication by Dr. K. Bauer). One may suppose that all these migrants are strays coming from the Carpathians.

The study by J. Kratochvíl and F. Vala on the disappearance of the lynx in Bohemia and Moravia outlines the process of extermination of the lynx in the remaining part of C. Europe. This study is based on historical data obtained in 82 localities in those countries. At first, the lynx was exterminated in lowlands and densely populated areas (in the course of the 16th and 17th centuries). In the highlands and foothills and even in more populated mountains the lynx disappeared some 100 years later (in the course of the 18th century). In the border mountains in the south and west of Bohemia the lynx occurred even as late as the beginning of the 19th century. In Bohemia, the lynx was sooner exterminated than in Moravia, where the populations of lynxes were steadily strengthened by individuals migrating from the adjacent W. Carpathians. In Germany, the last lynxes were registered in the foothills of the Alps and in the Bavarian Alps. Some individuals were hunted there in the seventies and eighties of the last century (Floericke 1927). They might still be supposed to have belonged to the local populations. In other parts of the German Federal Republic the lynx was exterminated sooner. *E. g.*, in Württemberg a lynx was taken as late as 1846. In the mountains bordering the German Democratic Republic the lynx was frequent for a long time. In the Thüringer Wald Mts., there are records on the occurrence of the lynx in 1843 (Curry-Lindahl 1951). In the Harz Mts., some catches were registered between 1814 and 1818 (Floericke 1927). The latest evidence on the occurrence of the lynx in the territory of the German Democratic Republic comes from Saxony at the border with Czechoslovakia. The last lynx was killed there in 1717, in the environs of Hinterhermansdorf. In memory of this event it has been sculptured in the rock bearing the name of "Luchsstein" since that time (Floericke 1927). A description of the disappearance of the lynx in Germany is the subject of reports of several authors (*e. g.*, Hainard 1948, Guggisberg 1955, *etc.*). As a matter of fact, there are some more recent news on the occurrence of the lynx in Germany, *e. g.*, from Lusatia and Saxony (Boback 1957, Zimmermann 1959), from Bavaria (a written communication by Prof. Dr. H. Kahmann) *etc.* In all these cases the footprints of lynxes were the matter; in some cases the lynx was even seen but there is no evidence.

At present, the lynx does not occur in the territory of the Hungarian People's Republic. The latest records on its occurrence come from the northern mountainous parts of the country, due to the fact that this population used to be strengthened by individuals coming from the N. Carpathian forests. It is of interest that so far there is no evidence, not even observations of traces of the presence of lynxes in the territory of Hungary after World War II although the migrations of lynxes from the Carpathians have been rather extensive. Prior to World War I and at its beginning the lynx occasionally occurred in the territory of present Hungary. Such was the case in 1907 and 1915 as pointed out by J. Kratochvíl in this volume.

This is a brief outline of the process of disappearance of the lynx in western, southern and central Europe that lasted several centuries being the strongest in the course of the last 150—20 years (Figs. 2—4). The lynx was nearly fully exterminated in Scandinavia, the Carpathians, the Balkans and Spain. In the course of the last decennia, endeavours for its protection have been started in areas of its scarce occurrence, or at least for its controlled hunting. These noble struggles are gaining victory even if the lynx is known to cause great damage to game animals. In Czechoslovakia the gamekeepers believe each lynx individual to consume about 20—30 individuals of *Cervidae*, mainly roe-deer (Čermák et al. 1955) during the winter period. The number of losses may be imagined considering the fact that about 500 individuals of the lynx (Hell 1968) were estimated to inhabit Czechoslovakia in 1963. If the cultural interest of maintaining the lynx in the country is nevertheless prevailing over these losses, it certainly is the evidence of high cultural feelings of a nation. This is the case in Norway, Sweden, Poland, Czechoslovakia, Rumania, Yugoslavia and Spain.

In the western part of their area, the populations of the lynx are only little differentiated even if occupying isolated and independent areas of occurrence. Adding the populations inhabiting the Iberian Peninsula, the following picture is obtained:

(1) The Iberian Peninsula is inhabited by remains of the population of the Spanish lynx [*Lynx pardina* (Temmick, 1824)]. There are endeavours for its conservation.

(2) Fenoscandia and the neighbouring areas of the U. S. S. R. southward down to the drainage area of the Pripet River, as well as the adjacent northern parts of the Polish People's Republic are inhabited by lynx populations which may be considered to be the nominate form. Granting this form the value of a nation, this population can be designated as *Lynx lynx natio lynx* (Linné, 1758). At the western borders of their area they are protected by the State.

(3) The whole extensive arch of the Carpathians is inhabited by populations considered to be an independent nation by Kratochvíl and Štollmann (Štollmann 1963). In our present knowledge, these populations ought to be indicated as *L. l. natio carpathicus* Kratochvíl et Štollmann, 1963.

(4) The southern parts of Yugoslavia and the neighbouring areas of Albania and Greece are inhabited by remains of lynx populations that used to be spread all over the Balkans, perhaps with the exception of Peloponnesos. On ground of the individual taken in Macedonia, Bureš 1941 described them as an independent subspecies. Adjudging to it the value of a nation, the present population of the lynx living in the Balkans should be named *L. l. natio balcanicus* Bureš, 1941.

We are aware of the fact that the taxonomic evaluation of the lynx populations in the western part of their area in Europe is not definitively solved. It is of great importance for us to gradually accumulate adequate material of equal value which would be submitted to an experienced taxonomist or group of scientists in order to definitively solve the problem of the taxonomic value of the European populations. It is still more important to retain these populations in their native area. This is parti-

cularly true of the populations inhabiting the Iberian Peninsula, the Balkans and Fenoscandia as they are exposed to the greatest danger of extermination.

At present we know that there are real conditions and understanding of the responsible authorities for the conservation of the lynx.

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History of the Lynx Area

From the geological point of view the representatives of the subgenera *Lynx*, *Pardina* and *Caracal* are of rather high age; their excavated remains are better known than those of other *Felinae*. Among them the remains of medium-sized cats used to be found especially in the Upper Tertiary (Pliocene) formation of S. Europe — in France and Italy. Such a quantity of lynx bones found in palaeontological localities can be explained by the fact that the subgenus *Lynx* includes all forms of the widespread and little specialized type of cats. In the border region of the U. S. S. R., some remains of lynxes *Lynx cf. issiodorensis* were found in the Middle Pliocene deposits near the town of Stavropol (gravel trench of Kos'akin — team of the Z. I. N. and P. I. N. — Academy of Sciences of the U. S. S. R.) as well as in the Odessa catacombs (team of the Zoological Institute — Academy of Sciences of the Ukrainian S. S. R.).

Lynx bones similar to those of the recent species, *Lynx lynx* (L.), are seldom found in the Quaternary layers of caves, in the palaeontological settlements and post-palaeontological communities of man in W. and S. Europe (B. Wolf 1938, 1939; V. I. Gromov 1948; I. G. Pidopličko 1951, 1953).

Well known localities of lynx remains in the U. S. S. R. are mostly situated along the boundary of the forest and forest steppe area. The bones of Pleistocene Lynxes are usually missing from the river deposits of the Russian plain. Among thousands of bones discovered in the sand-banks of the Dnester, the Dneper, the Don, the Volga, the Kama, the Ural, we have ascertained the first phalanx of a Pleistocene lynx only, found near the Don River (in the close vicinity of the Zaton'skij brook — the area of the Ciml'ansk reservoir No. 23704, Z. I. N. — Academy of Sciences of the U. S. S. R.). In the late Pleistocene loess of the Desna River, 8 fragments of lynx bones were discovered in the environs of Novgorod Severskij (I. G. Pidopličko 1947).

Single remains were found in the late Pleistocene layers round the settlement of Goncy, Poltava region.

The lynx was rare in the river valleys of the Russian plain both in the Upper Pleistocene and in the later historical period. From this point of view, there is an entire lack of lynx remains in the Upper Palaeolithic layers along the upper stream of the Don River near the town of Voronež (Kost'onki-Borščego region of the Palaeolithic settlements) and in those of the medieval fortress of Sarkel (central part of the Don River valley). In these layers 480,000 bones were examined, but not a single specimen of a lynx was found there.

There are frequent Pleistocene and later lynx remains coming from the caves of the Crimea, the Caucasus and the Urals. In the Crimea, in the Šajtan-Koba cave, three lynx phalanxes were found (No. 15981/1-3/Z, I. N. — Academy of Sciences of the U. S. S. R.); in the Adži-Koba cave deformed bones of a fore limb as well as two fore phalanxes were discovered (team of the Z. I. N. — Academy of Sciences of the U. S. S. R.). In the Šan-Koba cave unique remains of lynx bones were discovered.

In the Caucasus the fragments of lynx bones and teeth were found in the Aurignacian layers of the Sekaž'a cave (Georgian Museum). Near the settlement of Čoh (Daghestan) one lynx canine was found and in the early Bronze Age layers (bay of Gelendžik) one tooth of the upper jaw was determined (team of the Z. I. N. — Academy of Sciences of the U. S. S. R.).

South of the Caucasus, in Asia Minor and Iran, no lynx remains were found either

in the Palaeolithic or post-Palaeolithic layers although the lynx has occurred here both at present and in the past.

The discovery of a lower jaw with some incisors and canines, made recently in the layers near the locality of Staraja Ladoga at the mouth of the Volchov River (team of the Z. I. N. — Academy of Sciences of the U. S. S. R.), should be mentioned here as well.

According to V. I. Calkin (1958), a left jaw and some distal parts of a humerus were found in the medieval layers of the fortress of Asote (the W. Dvina) and in the early Bronze Age layers near Daugmale in the environs of Riga.

In the S. Urals two fragment of instep bones (No. 20240 — 4, Z. I. N. — Academy of Sciences of the U. S. S. R.) were found in the medieval layers of the Bičky cave.

In the N. Urals the lynx remains are especially known from the Bronze Age layers (the Kaminskaja cave) along the upper stream of the Pečora River.

Last but not least, we have to mention different lynx bones found in the Čagirskaja cave (the Altaj Mts.) and in the Nižne-Udinskaja cave (region of Irkutsk) (I. F. Brandt 1870; I. D. Čerskiĭ 1891).

Lynxes seem to have spread northwards and have assimilated there only recently, in the Holocene. This assumption is confirmed by the fact that not a single lynx bone has been found among the many tens of thousands of bones found in the Pleistocene layers of the N. Urals.

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Rapport sur la Disparition du Lynx en France

Bien que la presse signale de temps en temps la présence d'un Lynx. *Lynx lynx* (Linnaeus, 1758), dans l'un ou l'autre des massifs forestiers, il semble bien que cette espèce ait disparu de France.

D'après les anciennes chroniques, le Lynx ou Loup Cervier habitait autrefois toutes les régions boisées. Dès le XVII^e siècle, il n'existait déjà plus qu'en montagne, d'où il a disparu peu à peu.

Vosges et Alsace: Il est éteint depuis le XVII^e siècle. La dernière capture fut effectuée le 13 décembre 1640 à Etupes, dans le sud de l'Alsace.

Jura: La dernière capture a été effectuée en 1885 près de Salins. La presse avait signalé la capture à Lure (Haute Saône) en 1958 de deux Lynx et Hainard (1962) dans son livre sur les Mammifères d'Europe en fait état. L'enquête a montré qu'il s'agissait de deux Chats sauvages. En Lorraine, la disparition fut beaucoup plus précoce, peut-être à cause du déboisement.

Massif Central: La dernière capture a été effectuée à Genolbac dans le département de la Lozère en 1875.

Alpes: Le Lynx s'est maintenu longtemps dans les Alpes et sa disparition est récente. La dernière capture pour le massif a été effectuée en 1909 près d'Arvieux (Hautes Alpes), mais le Lynx a été observé sans toutefois être capturé en 1913 dans les Hautes Alpes et dans les Basses Alpes. D'autre part, des massacres de moutons ont été attribués au Lynx en 1909-1911 et 1930, mais on ne saurait être trop prudent dans ces cas et il semble préférable de ne pas tenir compte de ces dernières observations.

Pyrénées: La disparition du Lynx des Pyrénées est toute récente. Dans le département des Pyrénées Orientales, on a capturé l'espèce du nord de l'Europe, en 1917, dans le massif du Canigou.

Dans les Pyrénées Centrales, le Lynx d'Espagne, *Lynx pardina* (Temminck, 1824), passe quelquefois la frontière et on peut l'observer dans le Massif de Néouvielle. D'après Hainard (1962) la dernière capture daterait de 1957 au pic du Midi d'Ossau mais je n'ai pas pu avoir confirmation. Il n'est pas impossible que des Lynx d'Espagne fréquentent de temps en temps la tête des vallées pyrénéennes mais il s'agirait peut-être d'une transhumance et on ne peut plus compter le Lynx comme habitant autochtone des Pyrénées françaises.

Législation de la chasse

Le lynx est considéré comme disparu et ne figure pas parmi la liste des animaux nuisibles. Aucune prime n'est versée pour sa capture.

Liste du matériel disponible dans les Musées

Quelques Musées de province possèdent des documents. Rien n'a été trouvé au Muséum d'Histoire Naturelle à Paris.

Musée de Hyères: Un squelette complet (femelle adulte, capturée après 1912), deux individus montés. Tous les trois proviennent des Basses Alpes.

Musée de Grenoble: Deux individus naturalisés provenant des Alpes.

Musée de Nîmes: Un animal monté en assez mauvais état, capturé en 1875 près de Génolhac (Lozère).

Musée de Gap: Crâne d'un animal capturé fin septembre 1890; un animal monté, capturé en 1890: un crâne et une peau. Les trois individus proviennent du Queyras (Basses-Alpes).

Musée du Puy en Velay: Un animal monté, tué en 1822 près du Puy (Haute Loire).

Musée de Valence: Deux animaux montés en bon état, pas de provenance ni de dates de capture.

Il est très probable que cette liste n'est pas complète, plusieurs Musées n'ont en effet pas répondu à l'enquête. Il est possible qu'il existe des documents dans d'autres Musées, en particulier ceux de: Annecy, Cannes et Aix. Il s'agirait d'animaux en provenance des Alpes.

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*) C'est un ouvrage essentiel qui rend compte de toutes les captures effectuées en France entre 1800 et 1930. Il comprend de très nombreuses références bibliographiques. L'auteur estime qu'à la date de parution de l'ouvrage, le lynx existe peut-être encore dans les Alpes et les Pyrénées.

***) L'auteur reprend les conclusions de Lavauden et ajoute quelques données sur des captures plus récentes. Une des données, vérifiée (capture en Haute-Saône), s'est révélée inexacte.

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Rapport sur la Disparition du Lynx en Italie

On peut affirmer que l'extinction du Lynx dans notre pays date d'une époque relativement récente, voilà pourquoi il est possible de trouver dans les Musées les plus anciens de l'Italie des exemplaires naturalisés de ce mammifère.

En Italie, il existe des problèmes sur le Lynx qui attendent encore d'être traités d'une manière définitive, par conséquent une enquête particulière sur ce sujet ne pourrait pas être considérée comme superflue.

La première question c'est l'existence de ce mammifère aux temps relativement récents ou historiques dans le centre de l'Italie, au sud et dans les îles.

La deuxième question est celle-ci: vivait-elle, en Italie, une espèce différente de celle du nord et notamment l'espèce de *Lynx pardina* (Temminck, 1824) qui vit encore dans la péninsule Ibérique.

Dans la littérature on trouve des allusions sur l'existence du Lynx dans les régions du sud et dans les îles se rapportant à *L. pardina*. Ces allusions ont été acceptées par certains auteurs (Trouessart 1910), tandis que d'autres auteurs ne les ont pas confirmées, surtout les plus récents, qui se sont occupés de l'état de distribution de ce mammifère, tout en laissant des doutes à ce propos. Même chez certains auteurs plus récents (Ellerman et Morrison-Scott 1951 et Brink 1956) on trouve des inexactitudes sur la distribution du Lynx en Italie.

L'objet de mes enquêtes était aussi bien celui de la recherche des nouvelles et des traditions locales, des citations de la bibliographie sur ce sujet, notamment les plus anciennes, ainsi que l'examen du matériel que j'ai trouvé dans les Musées d'Histoire Naturelle de mon pays.

Distribution

Les nouvelles et les traditions locales que j'ai trouvées sur l'existence du Lynx dans notre pays datent depuis le début du XX^e siècle. Le «Laboratorio di Zoologia applicata alla Caccia» a mené, à plusieurs reprises, des enquêtes sur la consistance de la faune dans les différentes régions. Le Lynx a disparu de toutes ces enquêtes. Les cas sporadiques signalés n'ont pas été confirmés par un soigneux examen rassurant.

En ce qui concerne l'existence de *L. pardina*, comme a écrit Ghigi (1911) qui traitait ce sujet, cette espèce «n'a jamais existé en Italie et toutes les soi-disant Lynx de Calabre, de Sicile ou de Sardaigne ne sont que des Chats sauvages»; par conséquent tombe l'affirmation de Trouessart (1897), qui situe *L. pardina* dans ces régions. Cette affirmation est soulignée encore dans le travail successif de Ghigi (1917) «toutes les autres captures de Lynx dans les autres régions d'Italie (exception faite pour le Piémont) doivent être attribuées à des renseignements faux ou à des confusion faites avec les Chats sauvages».

Lynx sardiniae Mola, 1908 — que Ellerman et Morrison-Scott ont attribué dans leur liste des Mammifères paléarctiques et indiens (1951) à une sous-espèce locale de Lynx (*Lynx lynx sardiniae* Mola), qui d'ailleurs ne doit pas être considérée — comme j'ai déjà eu l'occasion d'écrire (Toschi 1965) — comme un Lynx proprement dit, mais au contraire, un Chat sauvage de la Sardaigne (*Felis libyca sarda* Lataste). «Les pinceaux auriculaires du Chat sauvage de la Sardaigne et ses raies interrompues ont déterminé l'erreur». D'autre part la synonymie de *Lynx sardiniae* Mola avec *Felis sarda* Lataste a été admise par Ghigi (1911).

Données bibliographiques

Les données sur l'existence du Lynx en Italie au passé que l'on peut trouver chez les auteurs anciens, ne sont pas nombreuses.

Castelli (1935) mentionne les Acta Tirolensia (publiés par le Prof. Wopfner) selon lesquels, pendant les années 1519—1524, les sujets de Gudon (près de Chiusa d'Isarco. Trente) se plaignaient du fait que dans leur montagnes vivaient librement l'Ours, le Loup et le Lynx qui causaient de grands dommages.

«Nous apprenons d'une proclamation du XVI^e siècle que dans le département de Kufstein les habitants étaient obligés de chasser les Ours, les Loups, les Lynx et les Sangliers et beaucoup d'autres animaux dangereux, sous peine de châtement». (Castelli 1935).

L'empereur Maximilien (XVI^e siècle) a promulgué, dans le Tyrol, des dispositions sévères pour protéger de nombreuses espèces de gibier et supprimer le braconnage. De toute façon aucune autorisation n'était nécessaire pour tuer le Loup, l'Ours et le Lynx, au contraire, ce type de chasse était rémunéré par des prix spéciaux (Castelli 1911).

Une ancienne citation sur la présence du Lynx dans les Alpes italiennes se trouve dans la description géographique du Trentin par M. S. von Wolkenstein (1630), où on lit, à propos du département de Monreale, territoire situé sur la gauche orographique de la Vallée de l'Adige, entre Lavis et Salorno, que le département présente les espèces de gibier suivantes: Cerfs, Lynx, Chats sauvages, Ours, Renards, Martres, Blaireaux, ensuite on y trouve une certaine quantité de Lièvres et parfois de Sangliers (G. Tomasi, in litteris le 28 octobre 1965).

Je n'ai pu trouver des informations concernant le XVIII^e siècle. En ce qui concerne l'importance du Lynx dans les Alpes centrales pendant le siècle suivant, je cite Pampolini (1924): «presque dans toute la Suisse, vers la moitié du siècle dernier le Loup, le Lynx, le Castor, le Bouquetin, le Cerf et le Sanglier ont disparu, ainsi que l'Ours, à la suite d'une persécution acharnée».

En ce qui concerne les Alpes centrales et orientales, on lit chez Catullo (1838): «*Felis lynx* L. Lovastrello». L'existence de ce chat dans les Alpes du Cadore était pour moi problématique car je n'ai jamais trouvé une personne qui m'assurerait d'avoir tué un animal de cette espèce. De toute façon, j'ai entendu dire plusieurs fois que différentes personnes avaient vu cet animal à la campagne et entendu sa voix qui ressemblait aux hurlements du Loup; c'est pour cette raison que les habitants lui ont attribué le nom de «Lovastrello». Aujourd'hui c'est hors de doute que le Lynx vit et pullule dans les montagnes du Cadore, car au mois d'avril 1837 une femelle de cette espèce a été capturée dans le bois d'Auronzo. Cette femelle très âgée était grosse et proche à l'accouplement. Le chasseur l'a menée à Bellune pour obtenir le prix accordé par le Gouvernement... ensuite M. Doglioni a acheté cette femelle pour la placer dans la collection locale d'animaux.»

Comme le Prof. Capra écrit (in litteris le 13 mai 1965) on ne trouve d'autres nouvelles sur le Lynx dans la Vénétie, ni en Ninni (1875), ni en Arrigoni degli Oddi (1894).

Les rapports récents et répandus sur sa présence en Italie concernent les Alpes, notamment les Alpes occidentales. Gené (1850) a écrit «... je dirais qu'il soit commun dans les Alpes piémontaises et surtout dans la Vallée d'Aoste».

Dernièrement c'est encore Ghigi qui s'est occupé en détail de la consistance du Lynx en Italie, en se servant aussi des enquêtes sur la faune menées par la Società pro Montibus et Silvis et publiées en 1911. L'auteur ci-dessus mentionné incline à croire «que cette espèce a presque disparu en Italie». A présent il semble que le Lynx soit localisé près des Langhe, dans la province de Cuneo. Le sous-inspecteur M. Perotta nous fournit des informations sûres à propos des captures suivantes qui avaient lieu dans:

la localité de Vinadio: 2 exemplaires adultes en février 1883 — Vallée de S. Anna; 1 Lynx adulte et deux petits en février 1885 dans les roches de Nantés; 1 exemplaire adulte en mars 1901 à Selva di Besson.

Le président de la Députation de la Province de Cuneo me fit savoir que 4 Lynx avaient été capturés, le 1^{er} en 1894, le 2^e en 1898, le 3^e en 1902 et le 4^e en 1903. Après cette date aucune capture ne fut plus signalée, bien que l'Administration de la Province de Cuneo payât un prix spécial de L.50 au tueur d'un Lynx. Par conséquent on peut présumer que le nombre des Lynx dans la Province de Cuneo est très limité, n'ayant plus d'éléments qui prouvent cette affirmation. Jusqu'à ce moment les nouvelles sont précises.

En ce qui concerne les informations inexactes, prises au sens général, Dr. Mario Montanaro, Secrétaire de la Société des Chasseurs de Dogliani, nous fait savoir que le Lynx se trouve dans les Alpes voisines.

La présence de cette espèce est aussi signalée par le chasseur Beltrando Agostino au Colle di Tenda. M. Sebastiano Lissone, député de la province de Cuneo, me fit savoir que les gardes-chasse de S. M. le Roi, affirmaient que dans les Réserves Royales existaient encore des Lynx qui attaquaient surtout les chamoix. A mon avis, ces informations ne permettent pas d'affirmer que le Lynx a complètement disparu dans les Langhe.

Ensuite (1917) Ghigi revient sur l'importance du Lynx en Italie: «A présent le Lynx est toujours localisé et très rare dans les forêts des Langhe, dans les Alpes Maritimes et en province de Cuneo.» On peut lire chez Perlini (1923): «En ce qui concerne nos Alpes, les Lynx se trouvaient surtout dans les Graies, les Pennines, les Cozies et les Alpes Maritimes;» déjà en 1812 Bonelli a écrit: «les Lynx sont rares dans nos Alpes» et différents auteurs, qui ont ensuite discuté ce problème, sont d'accord en affirmant que la disparition définitive du Lynx ne s'est pas encore produite, mais de toute façon qu'elle est très proche.

Sibari a admis l'existence du Lynx dans le territoire du Parc National des Abruzzes. Il reporte des témoignages des paysans et des administrateurs de la Maison Royale d'Italie sur la présence et la tuerie de ce mammifère jusqu'au 1924 dans le même territoire, mais il n'est pas possible avoir la certitude qu'il s'agissait vraiment de cette espèce et je n'ai pas réussi à retrouver aucune de ces exemplaires dans les collections italiennes.

Par conséquence il persiste l'impossibilité de rétenir comme certaine la présence de ce mammifère jusqu'au début du siècle dans les Abruzzes et de savoir de quelle espèce du Lynx pouvait il s'agir.

Récemment la littérature traitant ce sujet réaffirme en substance ce qui a été rapporté par ces derniers auteurs et surtout par Ghigi (Scortecchi 1953).

La matériel dans les Musées d'Italie

Les enquêtes menées dans les Musées de Zoologie et dans les collections zoologiques des Musées d'Histoire Naturelle d'Italie, dans le but de déterminer l'importance du matériel des Lynx de provenance italienne sûre, et les indications possibles concernant les lieux et les dates de capture, ont donné les résultats suivants:

Bergame: Un exemplaire naturalisé avec l'indication «Russie» — sa validité étant cependant douteuse. (Le Directeur du Museo Civico — Prof. A. Valle).

Bologne: Un exemplaire naturalisé avec l'indication: ♀, tué près de Valdieri (Cuneo) le 1. 11. 1909.

Florence: Trois exemplaires naturalisés: ♀ ad. tué dans la Vallée d'Aoste par Vittorio Emanuele II au mois de juillet 1872. Peau montée et crâne C. 445. ♀ ad. tué à Ponte

San Martino (Ivrée) le 10. 3. 1824. Peau montée et crâne C. 438. ♂ juv. tué à Entraque (Cuneo) le 1. 1. 1881. Peau montée et crâne C. 555.

On est informé aussi sur la capture de 2 jeunes Lynx ♀♀ qui a eu lieu dans les alentours de Valdieri le 12. 7. 1879. On ne sait pas où sont placés ces derniers exemplaires (Prof. A. M. Simonetta).

Gênes: Dans le Museo Civico de cette ville on ne trouve pas de Lynx italiens. Un exemplaire monté pourrait provenir des Alpes Maritimes (il est peut-être un des derniers exemplaires tués ici) mais ce n'est pas confirmé. (Le directeur Prof. E. Tortonese). Livourne: Ce Musée ne possède aucun exemplaire de Lynx. Je me rappelle d'avoir vu, il y a beaucoup d'années, dans le Musée joint à l'Institut de Zoologie de l'Université de Sassari un exemplaire sur lequel Mola, si je ne me trompe pas, a basé son *Lynx sardiniae* problématique. (Le directeur du Musée Provincial d'Histoire Naturelle — Prof. A. Razzauti).

Milan: Le Musée de Milan ne possède aucun exemplaire de Lynx italien. Nous n'avons qu'un exemplaire monté qui provient de la Suisse du Sud. et date de 1866. (Le Conservateur des mammifères du Musée d'Histoire Naturelle — Dr. L. Cagnolaro).

Pise: Notre collection comprend deux exemplaires naturalisés. Je suis en mesure de signaler la provenance exacte d'un exemplaire seulement: Les Alpes de la Vallée d'Aoste. (Le Conservateur de l'Institut de Zoologie et d'Anatomie comparée de l'Université — A. Lanfranchi).

Rome: Trois exemplaires naturalisés: ♂ provenant des Alpes occidentales N° 265. ♀ provenant des Alpes occidentales N° 246. ♀ provenant aussi des Alpes occidentales N° 247. Ils ont été donnés par Sa Majesté le Roi Vittorio Emanuele III; probablement ces individus avaient été capturés vers la fin du siècle dernier ou au début de notre siècle. D'autres indications manquent. (Le Conservateur du Museo Civico di Zoologia — Prof. E. Tamino).

Sassari: Parmi le nombre limité d'exemplaires de mammifères existant encore dans le Musée, il y a, entre autres, un exemplaire de chat sauvage de la Sardaigne, aujourd'hui un peu détérioré; aucun Lynx n'est présent. Je n'ai jamais eu l'occasion de voir le travail de Mola, mais j'en ai entendu parler; cependant je n'ai jamais entendu parler de Lynx vus en Sardaigne. Je pense donc que Mola a fait une faute, due à un enthousiasme excessif pour sa patrie. (Le Directeur de l'Institut de Biologie et Zoologie Générale de l'Université — Prof. N. Lepori).

Turin: 9 exemplaires naturalisés, dont 5 de provenance italienne — plus précisément: ♂, adulte, tué dans les Alpes, (N° 1254) à Millaneres (Susa) en 1885. — N° 310 tué dans les alentours de Pragelato (Turin), en février 1918. N° 1032 et N° 308 tués dans les Alpes Piémontaises par M. Comba il y a 90—100 ans. En plus, il résulte des inventaires du Musée que les exemplaires mentionnés ci-dessous se trouvaient dans les collections du Musée, mais qu'à présent ils ont été supprimés à cause de leur détérioration: ♀ capturé à Ponte S. Martino, près de Caremma. Vallée d'Aoste, Ivrée, le 10 mars 1824 par Giaè Bianco, N° 309. En même temps on a capturé deux autres exemplaires, le premier à Aoste et le deuxième à Bobbio, Pinerolo. Jeunes exemplaires capturés dans la vallée de Pellice en 1820, N° 311.

Les exemplaires de provenance étrangère: un exemplaire du Portugal, l'autre de la Laponie, 2 de l'Amérique du Nord.

Trente: Les 2 exemplaires naturalisés présents dans la collection de notre Musée proviennent de la collection privée de M. Griessmann de Oris (Val Venosta) et ont été

achetés par le Musée en 1925. On dit, ce qui n'est pas prouvé, qu'ils appartenaient à une réserve de chasse ou jardin zoologique de l'Empereur François Joseph. (Le Directeur du Museo Tridentino di Scienze Naturali — Prof. G. Tomasi).

Venise: Dans notre musée il y a un exemplaire de Lynx provenant des collections de l'Instituto Veneto qui, par tradition, serait le dernier exemplaire capturé en Italie. Malheureusement rien ne le confirme. Dans les vieux catalogues de l'Institut, que j'ai consultés très soigneusement, je n'ai trouvé aucune trace concernant la provenance de cet exemplaire. (Le Directeur du Museo Civico di Storia Naturale — Prof. G. Soika).
Vérone: J'ai eu personnellement un crâne de Lynx, tué par le Roi Vittorio Emanuele II à Valdieri, qui se trouve aujourd'hui dans le Musée de Vérone. (Le Conservateur des Mammifères du Museo Civico di Storia Naturale — Dr. Angelo Pasa).

Des enquêtes, exécutées en collaboration avec les principaux Musées d'Italie, on peut tirer les conclusions suivantes: Les Musées possédant les exemplaires de Lynx sont au nombre de onze: c'est-à-dire ceux de: Bergame, Bologne, Florence, Gènes, Milan, Pise, Rome, Turin, Trente, Venise, Vérone, mais il semble que seulement huit possèdent des exemplaires de provenance italienne, car l'exemplaire de Milan vient de l'étranger et l'origine des Lynx aux Musées de Bergame et de Trente est douteuse. Le Musée le plus riche en exemplaires de Lynx italiens et étrangers c'est, sans aucun doute, celui de Turin, qui comme nous l'avons vu, possède cinq exemplaires provenant des Alpes italiennes, et quatre exemplaires provenant de l'étranger. L'exemplaire le plus ancien semble être celui qui est exposé sous le N° 310 au Musée de Turin (Pragelato 1818): l'exemplaire de Bologne semble avoir été capturé plus récemment (Valdieri 1909).

De toute façon il faut rappeler que pour certains exemplaires la date de capture est absente ou douteuse. Soulignons ensuite que parmi le matériel existant dans les musées italiens nous ne trouvons aucun exemplaire de provenance sûre des Alpes orientales et centrales.

Les derniers exemplaires de Lynx capturés en Italie

Les auteurs qui se sont intéressés à la recherche des nouvelles sur les derniers Lynx observés et tués dans notre pays sont Ghigi (1911, 1917), Ghidini (1912) et Perlini (1923).

Ghigi (1911) compte au nombre des derniers Lynx les exemplaires suivants capturés dans les Langhe: 2 exemplaires adultes dans la vallée S. Anna (Vinadio, en février 1883). Un exemplaire ♀ adulte et deux petits dans les rochers de Nantes (1885). Un exemplaire en 1894; un autre en 1898 (toujours dans la province de Cuneo). Un exemplaire adulte dans la forêt de Besson, en mars 1901. Un exemplaire en 1912 et un autre en 1903 (Alpes de la province de Cuneo).

Ghidini cite deux autres exemplaires: le premier tué en 1903 et l'autre en 1905 au-dessus de Valdieri.

La liste de Perlini est plus complète; elle comprend les captures sûres connues depuis 1813 jusqu'à l'hiver 1915, date à laquelle fut tué le jeune exemplaire de Angrogna (Pinerolo). Ce dernier événement est précédé de deux captures, la première en 1909 et la deuxième en 1913, dans la province de Cuneo.

Il faut encore remarquer qu'au début du XX^e siècle, lorsque les derniers Lynx avaient été exterminés, l'administration de la province de Cuneo assignait un prix de L. 50 pour leur capture (!)

Ghigi pense que le Lynx a désormais disparu en Italie. Perlini affirme que la disparition de cet animal ne s'est pas encore produite, mais qu'elle est cependant très proche. En effet, depuis la publication des ouvrages de ces auteurs jusqu'à nos

jours, aucun rapport de captures de Lynx ne nous est venu; par conséquent la capture citée par Perlini en 1915 semble être la dernière que l'on connaît. Il est un fait intéressant, que dans la Suisse pas trop éloignée le Lynx continuait à vivre plus longtemps dans les montagnes isolées et pleines de bois des Grisons, du Tessin et du Valais, c'est-à-dire dans les parties méridionales en proximité de la frontière italienne. Un exemplaire qui se trouve au Musée de Genève aurait été tué en 1902 à Brigue (Wallis). D'autre part le dernière observation faite en 1909 concernerait le Simplon (Baumann 1949).

En ce qui concerne les Alpes orientales l'événement fourni par Catullo se rapporte cependant au siècle dernier: «Aujourd'hui il n'y a aucun doute que le Lynx vit et pullule dans les montagnes du Cadore, étant donné qu'une femelle de cette espèce fut capturée au mois d'avril 1837 dans le bois d'Auronzo.»

Cette nouvelle nous fait penser que dès la moitié du XIX^e siècle la présence du Lynx doit être considérée comme rare et douteuse dans le Cadore. Cela confirme l'opinion que ce mammifère était rare et qu'il a disparu plus rapidement dans les Alpes orientales que dans les occidentales.

Causes de la disparition

La plupart des auteurs ont vu dans le déboisement une des causes principales de la disparition du Lynx. Nous, de toute façon, préférons parler des causes concomitantes plutôt que d'une cause ou de plusieurs en particulier.

Peut-être que l'action de déboisement, déjà considérable au XVIII^e siècle et plus encore aux siècles suivants était une des raisons de la disparition de nos félidés. Cependant leur disparition n'était que partielle, car il y en avait encore dans de vastes régions forestières et des lieux inaccessibles de nos Alpes où ils pouvaient trouver un abri sûr. D'autre part la zone des Langhe dans le Piémont, regardée comme un des derniers refuges du Lynx, ne peut être considérée comme particulièrement riche en forêts ou en lieux sauvages. Alors, elle ne représentait pas un refuge particulièrement inaccessible pour le Lynx.

A côté du déboisement il y a une autre raison qui a, sans aucun doute, une importance considérable: c'est l'augmentation de la population et le perfectionnement des armes à feu. Ces causes aussi sont responsables de la diminution en nombre du gibier que le Lynx attaque d'habitude. Par conséquent, même en ce cas, on peut voir une cause indirecte importante de la disparition de ce mammifère de proie.

Le fait que les derniers Lynx ont été capturés dans les bois de réserves royales, dans leur voisinage ou pas loin d'eux, fait présumer qu'une des raisons de leur survivance repose sur la constatation que ces mammifères avaient à leur disposition, pour une certaine période de temps relativement longue de gros gibier, en particulier les Chamois, qui, dans les autres parties des Alpes, sont devenus rares.

Les prix accordés pour la capture des Lynx et assignés jusqu'au moment de leur disparition, c'est à dire jusqu'au XIX^e et XX^e siècles, ont pu contribuer à l'extinction de cette espèce, quoique d'une façon non définitive. En effet la chasse aux Lynx a éveillé un intérêt tout à fait particulier chez des habitants des Vallées ainsi que celui des chasseurs.

L'isolement et la sporadicité des populations de ce félidé, avec interruptions dans la continuité de leur distribution, ont vraisemblablement donné le coup fatal à sa disparition.

Conclusions

De notre rapport on peut tirer les conclusions suivantes:

(1) Il n'y a pas de preuves qu'en Italie ont vécu, aux temps historiques relativement

récents, d'autres *Lynx* sauf l'espèce *Lynx lynx*. Tous les exemplaires de la provenance italienne sûre appartiennent à cette espèce.

(2) Tous les exemplaires de provenance italienne et qui se trouvent à présent dans les Musées d'Italie, proviennent des Alpes et notamment des Alpes occidentales (Piémont).

(3) Depuis 40 ans on n'a aucune information sur la capture ou la présence du *Lynx* en Italie, par conséquent cette espèce peut être considérée comme éteinte à partir de l'année 1915.

(4) Le dernier refuge du *Lynx* en Italie semble être celui des Alpes du Piémont, d'où viennent toutes les informations probantes concernant sa présence au début du XX^e siècle.

(5) La rareté du *Lynx*, qui a commencé d'être évidente à partir du XVI^e jusqu'au XVII^e siècles, est devenue plus consistante au XIX^e siècle. Beaucoup de facteurs, dont certains ont été mentionnés ici, ont contribué à la disparition du *Lynx* en Italie.

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Der Luchs [*Lynx lynx* (L.)] in Bulgarien

Über den Luchs in Bulgarien wurden zahlreiche Aufsätze publiziert, die auf das Interesse zurückzuführen sind, das dieses Tier vom Standpunkt der zoologischen Wissenschaft einerseits und der Jagdpraxis andererseits erweckt.

Die ersten Mitteilungen publizierten Georgiev (1890), Christovič (1893), Ireček (1899), Kovačev (1925), Petkov (1929), Kusev (1932), Popov (1933), Bötticher (1939), Bureš (1941), u. a. In allen bisher erschienenen Publikationen werden hauptsächlich Fragen der Verbreitung, zum Teil auch der Ökologie, der Jagd, des Abschusses, sowie des allmählichen Verschwindens dieses Tieres behandelt.

Einer Einladung des Korresp. Mitglieds der Tschechoslowakischen Akademie der Wissenschaften und Direktors des Instituts für Wirbeltierforschung bei der obgenannten Akademie in Brno, Herrn Prof. J. Kratochvíl folgend, erklärte ich mich bereit den Luchs in Bulgarien zu studieren und eine Abhandlung über dieses Tier zu verfassen. Meine Aufgabe war nicht leicht, weil nur wenig Material zur Verfügung steht und die publizierten Abhandlungen über den Luchs in Bulgarien in verschiedenen Zeitschriften und Büchern verstreut sind.

Die Resultate meiner Untersuchungen lege ich in folgender Reihenfolge vor: Verbreitung in Bulgarien; Verbreitung auf der Balkanhalbinsel; vom Luchs besiedelte Biotope; Art- und Unterartzugehörigkeit der bulgarischen Luchspopulation; wissenschaftliches Material; Literatur.

Herrn Prof. J. Kratochvíl danke ich an dieser Stelle bestens für seine Einladung, an der Erforschung des Luchses in Europa teilzunehmen. Dieser Einladung leistete ich im Rahmen der Aufforderung des „Internationalen Naturschutzbundes“ zur Erhaltung des Luchses Folge und die Bearbeitung der Luchsfrage sollte auch das wissenschaftliche Material in den Instituten und die Exponaten in den Museumsexpositionen betreffen.

Verbreitung

In vorgeschichtlicher Zeit war der Luchs auch in Bulgarien verbreitet (Abb. 6). Seine Reste wurden mit den Knochen vieler Wild- und Haustiere auf dem Hügel einer Siedlung bei dem Dorfe Salmanovo, Gebiet „Bakadžik“, Kreis Preslav (Popov 1933), gefunden. Laut diesem Autor dienten die erwähnten Tiere dem vorgeschichtlichen Men-



Abb. 5. Linker Unterkiefer von *Lynx lynx* (L.) aus dem Dorfe Salmanovo (Bez. Preslav).

sehen als Nahrung. Unter den Knochenresten entdeckte er auch einen linken Unterkiefer von *L. lynx* (Abb. 5).

Nach den Literaturangaben war der Luchs auf folgenden bulgarischen Gebirgszügen verbreitet: Rila, Rhodopen, Stara-planina, Stredna-gora und Losenka-planina. Die für Strandža-planina und Pirin (Ztg. Zora, No. 4730, 1935) publizierten Angaben (T. de M. 1910, Kovačev 1925, Petkov 1929, Bureš 1941) ziehe ich ebenfalls in Betracht. Die aus Rui-planina (Ireček, 1899), Vlasi-planina (Christović 1893, Kovačev 1925), der Umgebung der Karantina bei Burgas (Ireček 1899, Kovačev 1925, Petkov 1929) und aus Sakar-planina (Kusev 1932) stammenden Daten berücksichtige ich jedoch bei meinem Studium nicht.

Die ersten Mitteilungen über das Vorkommen von *L. lynx* in Rila-planina stammen aus dem Jahr 1862: zwei junge Exemplare wurden an der Lokalität Čermena in der Umgebung des Rila-Klosters gefangen (Velev 1901, Savojev 1957).

Ein Luchs wurde von Grenzposten im Jahr 1887 in der Örtlichkeit Demirkapia, Bezirk Samokov erlegt (Velev 1901) (Abb. 6). Luchsspuren wurden Ende Februar 1894 am Ufer des Flusses Iljina festgestellt. Beim Grenzpostenpunkt Smeseto löteten Soldaten einen Luchs im Jahr 1905; 4 junge Exemplare wurden aller Wahrscheinlichkeit nach im gleichen Jahr in der Nähe von Tichčiskite kolibi gefangen; ein Luchs

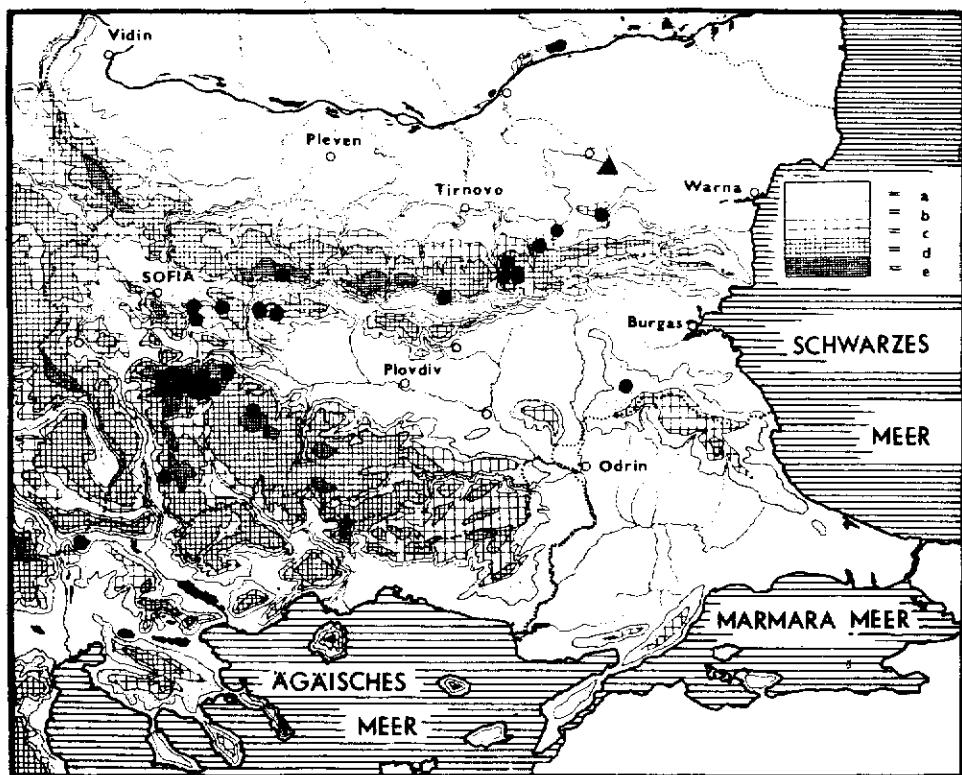


Abb. 6. Verbreitung des Luchses (*Lynx lynx*) in Bulgarien. Erklärungen: 1. Vorkommen in vorgeschichtlicher Zeit. 2. Vorkommen von 1862 bis 1935. Seehöhe: a, 0–300 m; b, 300–600 m; c, 600–1000 m; d, 1000–2000 m; e, 2000–3000 m.

wurde in der Umgebung des Rila-Klosters im Jahre 1908 erlegt und vom ehemaligen Zaren Ferdinand erworben: Spuren zweier Luchse beobachtet in Borovec (Cam-Kurija) J. Milde. In den Rayonen von Bričbor, Kriva reka und Suchičal, wurden im Jahr 1911, wenn auch selten, Luchse beobachtet und im Winter des Jahres 1915 konnten die Spuren zweier Luchse in der Nähe des Schloßes Sitnjakovo festgestellt werden (Kazarov 1926, Bötticher 1939).

In den urwaldähnlichen Nadelwäldern der West-Rhodopen, Gipfel Sütka, wurde im Jahre 1891 ein Luchs erlegt (Anonym 1901—1902) — Abb. 6.

Wie weit das Losen-Gebirge von *L. lynx* besiedelt wurde, ersehen wir aus folgenden Angaben. In diesem Gebirge auf dem Gebiet oberhalb des German-Klosters, schoß ein Jäger im Februar des Jahres 1899 auf einen Luchs und am 30. Dezember des gleichen Jahres wurde in der Lokalität Urvič ebenfalls ein Luchs beobachtet (Velev 1901) — Abb. 6.

In der Sredna-gora gab es auch Luchse. Für diese Behauptung spricht der im Jahr 1899 von einem Hirten mit einem Knüppel unter Beihilfe dreier Schäferhunde getötete Luchs im Rayon der dichten Wälder beim Dorf Petrič, Bezirk Panagürische (Abb. 6). Ein Luchs wurde auch im Jahr 1892 von G. K. Christovič erworben, präpariert und zu wissenschaftlichen Zwecken den zoologischen Sammlungen der Universität übergeben. Im Jahr 1938 wurde dieses Präparat in die Sammlungen und die Exposition des Naturhistorischen Museums, des heutigen Naturwissenschaftlichen Museums bei der Bulgarischen Akademie der Wissenschaften, eingereiht. Während der am 30. III. 1944 auf Sofia erfolgten Bombenangriffe wurde dieses Exponat schwer beschädigt. Zwei Luchse wurden von J. Milde auf dem Gipfel Malak-Bratija, Bezirk Panagürische im Jahre 1891 beobachtet und einer wurde im Rayon des Dorfes Verinsko (Čamšedinovo), Bezirk Ichtiman, im Jahre 1908 von Soldaten getötet (Kazarov 1926).

Die Stara-planina wurde zum großen Teil, hauptsächlich in den Zentral- und Ostgebieten, von *L. lynx* besiedelt (Abb. 6). Die ersten Angaben stammen aus dem Jahr 1882, aus denen hervorgeht, daß ein Luchs oberhalb des Dorfes Kran von einem Jäger und ein anderes Exemplar in den Felsgebieten oberhalb des Dorfes Koprivštica im Jahre 1886 erlegt wurde (Savoev 1957). Zwölf Jahre später wurde am 15. VIII. 1898 im Tvardiši-Balkan, Ortschaft Šeskin rid, ein männlicher Luchs erlegt und am 25. XII. 1898 erlegte derselbe Jäger ein Luchswelbchen bei einer Treibjagd an der Lokalität Siltari (M. L. 1900). Zwei Jahre später, im Jahre 1902, wurde noch ein dritter Luchs zur Strecke gebracht (Kazarov 1926).

Der letzte Luchs aus der Stara-planina wurde im Jahr 1902 im Varbiški-Balkan von einem Jäger aus dem Dorfe Krajgorci (Abduarachmanlar), Gemeinde des Dorfes Varbiza, Bezirk Preslav, geschossen (Anonym 1901—1902, Kazarov 1926). In diesem Gebirge gab es einen Überfluß an Rehen und Hirschen. Nach Angaben des ersten Autors wurde 15 Jahre früher, d. h. im Jahre 1887, ein anderer Luchs in der Umgebung des Dorfes Tiča erlegt und in den Wäldern des Dorfes Krajgorci lebten noch zwei Luchse (Abb. 6).

Man setzt voraus, daß der letzte Luchs in Bulgarien in Strandža-planina, Bezirk Elchovo, im Jahr 1930 (Ztg. Zora, Nr. 4730, 1935; Bureš 1941) erlegt wurde. Nach den in dieser Zeitung vom 4. IV. 1935, Nr. 4730, veröffentlichten Mitteilungen wurde der letzte Luchs in unserem Land in einem Dorfe bei der Stadt Melnik in der Nacht zum 20. III. 1935 getötet. Er wurde wahrscheinlich vom Hunger in das Pirin-Gebirge getrieben, suchte die Gebirgsniederungen auf und überfiel den Hühnerstall eines Bauern, der den Luchs mit einem Knüttel erschlug. Wieweit man mit der Wahrscheinlichkeit rechnen kann, daß dieses Tier aus den Mazedonischen Bergen in das Pirin-Gebirge kam, ist schwer zu sagen.

Die seit einem Jahr eintreffenden Nachrichten, daß *Lynx lynx* von neuem im Zentralmassiv der Stara-planina zu sehen ist, sind durchaus nicht beruhigend, da man in Betracht ziehen muß, daß wir es mit einem Tier zu tun haben, das durch ökologische Veränderungen stark beeinflusst wird; diese Veränderungen traten bei uns als Folge der Abnahme der jahrhundertealten Wälder ein und wirkten sich zweifellos auch auf die abnehmende Zahl des Wildes aus, das seine trophische Basis darstellt; auch Krankheiten können auf die Vitalität und zahlenmäßige Stärke der Luchspopulationen eingewirkt haben. Es waren also mehrere Faktoren, die bei der Abnahme und dem Verschwinden von *Lynx lynx* aus dem Territorium Bulgariens eine Rolle gespielt haben.

Biotope

L. lynx: besiedelte in den bulgarischen Gebirgen große Waldkomplexe, schwer zugängliches Gelände mit reichem Dickicht und Felsgruppierungen, vom Laubwaldgürtel bis zur oberen Grenze der Nadelwälder.

Im Rila-Gebirge besiedelte er folgende Biotope: Latschenwälder, jahrhundertealte unberührte Nadel- und Laubwälder und solche, die mit reichem Dickicht bewachsen sind. In den Rhodopen: Natürlich erhaltene Nadelwälder.

Losen-Gebirge: Große Laubwälder mit viel Unterholz, schwer zugängliche Felsgruppierungen.

Sredna-gora: Dichte und große Laubwälder.

Stara-planina: Jahrhundertalte Laub- und Nadelwälder, Felsgelände mit typischem Dickicht überwuchert.

Die Beobachtungen zeigen, daß das Tier die gewählten Biotope nach der Qualität und Quantität des vorhandenen Wildes wechselte (Rehe, Hirsche, Gemsen, Hasen, Herden von Haustieren auf ständigen Plätzen oder in Bewegung u. a.).

Art- und Unterartzugehörigkeit der bulgarischen Luchspopulation

Früher wurde angenommen, daß die Population der bulgarischen Luchse zur spanischen Art *Lynx pardina* (Temminck, 1824) gehört (Christović 1893, M. L. 1901, Velev 1901, Nedelkov 1901, Kovačev 1925, Petkov 1929), während T. de M. (1910) sie als *L. vulgaris* Kerr. und Kusev (1932) als *L. lynx* (L.) bezeichnet.

Popov (1933) untersuchte die Kiefermaße des Tieres aus dem Dorf Salmanovo und stellte fest, daß diese völlig den Maßen von *L. lynx* entsprechen, sich aber erheblich von jenen bei *L. pardina* unterscheiden. Er vergleicht M_1 beim bulgarischen Luchs, sowie auch die Längen von $P_3 + P_4$, von $P_3 + P_4 + M_1$ und die Längen von C bis M_1 , die viel größer sind als bei dem spanischen Luchs, während dieselben Maße bei dem Kiefer aus Salmanovo und dem Kiefer des europäischen Luches (*L. lynx*) fast identisch sind. Er schließt daraus, daß in Bulgarien im Neolithikum *L. lynx* gelebt hat.

Bureš (1941), von den obenerwähnten Untersuchungen von Popov (1933) ausgehend, untersuchte zwei Luchskiefer metrisch (das eine Exemplar aus Šar-planina, Ortschaft Sokolovec (Mazedonien) und stellte fest, daß der mazedonische Luchs mit seinen großen Kiefermaßen zur Population der europäischen Art *L. lynx* gezählt werden kann. Einige Eigenheiten der Fellzeichnung (kurzer Schwanz, dessen Spitze nur zum Drittel schwarz ist), bringen ihn berechtigterweise auf den Gedanken, daß es sich um eine Unterartkategorie — wie ssp. *balkanicus* handelt. Zur Bestätigung dieser Annahme sind jedoch noch biometrische und kranio-metrische Angaben in Ziffern nötig, die in der Arbeit von Bureš fehlen.

Die durchgeführten dentologischen Vergleiche von Popov (1933) aus dem Dorf

Chronologie der beobachteten und erlegten *L. lynx* (*L.*) in Bulgarien seit den Jahren
1862 bis 1935

Jahr	Erlegt oder beobachtet	Fundort mit Höhenangabe	Biotop	Nahrung
1862	2 Junge gefunden	Rila-Kloster, Ürtl. Čermena. 1100 m ü. d. Meeresspiegel	Höhle	
1882	Erlegt	Stara-Planina, Dorf Kran, Bez. Kazanlak. 350–400 m Höhe	Felsengelände und Dickichte	
1886	Beobachtet und erlegt	Stara-Planina, oberhalb Koprivštica (1000–1200 m Höhe)	Steile und felsige Gelände mit Dickicht überwuchert	
1887	Erlegt	Rila-Gebirge, Demirkapia, Bez. Samokov, 2539 m Höhe	Latschenwälder	
	Erlegt	Stara-Planina, Dorf Titša, Bez. Kotel, 600 m	Mischwälder und Dickichte	
1889	Erlegt und an d. Universität präpa- riert	Sredna-Gora, Dorf Petrič, Bez. Panagürische (500–800 m Höhe)	Dichte Eichen- wälder	
1891	2 Luchse beobachtet	Sredna-Gora, Gipfel Malak- Bratia, 1000 m Höhe	Eichenwälder und Dickichte	
	Erlegt	West-Rhodopen, Gipfel Sütka, 2187 m Höhe	Unberührte Nadelwälder	
1894	Luchsspuren auf einem verendeten Reh	Rila-Gebirge, am Ufer d. Flusses Ilijna, 1300 m Höhe		
1896	Lebend gefangen	Bulgarien, im Zoopark Berlin gezeigt		
15. 8. 1898	Erlegt ♂	Tvardiški-Balkan, Ürtl. Šiškin rid, 1250 m Höhe	Dichter Hochwald mit Unterholz	Voller Magen mit Fleisch
25. 12. 1898	Erlegt ♀	Tvardiški-Balkan, Ürtl. Šildari, 1250 m Höhe	Felsengelände, waldige und unzugängliche Plätze	Im Ma- gen Fleisch, das mit Fell- haaren vom Reh oder Hirsch ver- mischt war

Jahr	Erlegt oder beobachtet	Fundort mit Höhenangabe	Biotop	Nahrung
II. 1899	Angeschossen	Losen-Gebirge, oberhalb d. German-Kloster, 1000 m Höhe	Mischwälder und Dickichte	
30. 12. 1899	Beobachtet	Losen-Gebirge, Ürtl. Urvič, 1000 m Höhe	Felsengelände mit großen Wäldern und Dickicht	
1900	Erlegt	Tvardiški-Balkan (1250 m Höhe)		
I. 1902	Erlegt	Varbiški-Balkan (800—1000 m Höhe)	Jahrhundertealte Eichenwälder	
1905	4 Junge lebend gefangen	Rila-Gebirge, Tichtiški kolibi		
	Erlegt	Rila-Gebirge, Ürtl. Smeseto		
1908	Erlegt	Sredna-Gora, D. Verinsko (500—600 m Höhe)	Eichenwälder	
	Erlegt	Rila-Kloster (1100 m Höhe)	Misch- und Nadelwälder	
	Beobachtete Spuren	Čam-Kucija (1450 m Höhe)		
1911	Beobachtet	Rila-Gebirge, Bričebor (1200—2400 m), Kriva reka, Suchital (1500—2630 m)		
1915	2 Luchsspuren	Rila-Gebirge, oberhalb Sitnjakovo (1740 m Höhe)	Unberührte jahrhundertealte Nadelwälder	
1917	Luchsspuren	Rila-Gebirge, oberhalb Sitnjakovo (1740 m Höhe)	In jahrhundertealten Nadelwäldern	
1930	Erlegt	Strandža-Gebirge, Bez. Elchovo	Dichte Eichenwälder	
20. 3. 1935	Erlegt	Pirin-Gebirge, in der Nähe von Melnik (600 m Höhe)		

Salmanovo, wo $M_1 = 15,0$ mißt und diejenigen von Ognev (1935) für Estland ($M_1 = 14,9$) und Lappland ($M_1 = 15,2$), geben uns die Berechtigung die Population der bulgarischen Luchse zur Art *Lynx lynx* (L.) zu zählen. Derzeit können wir noch keine genauere systematische Gradation wegen Mangels an genügendem wissenschaftlichen Material vornehmen.

Wissenschaftliches Material

In den Sammlungen des Instituts befinden sich: ein fossiler linker Unterkiefer (Fig. 5); Teile des Präparats (Fell) von *L. lynx* aus dem Dorfe Petrič, Bezirk Panagürische. Teile der Skelettknochen von *L. lynx* aus Šar-planina (Mazedonien) und dokumentarische Etiketten einiger Exponate.

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History of the Lynx in Hungary

It is not the task of this paper to draw an exhaustive picture of the extermination of the lynx in the territory of the Hungarian People's Republic, as such a task requires very careful studies in archives, old chronicles and literature.

In this study we would show whether the increasing number of lynxes in Rumania and Czechoslovakia, due to the legalization of the protection of this feline carnivore after 1934 and 1935, resp., influenced the number of lynxes in the territory of Hungary. After World War II an eruption in the population of lynxes started in the Rumanian and W. Carpathians. In the territory of Slovakia the number of lynxes increased tenfold from 1935 to 1963, being thus 500 individuals. Similarly, the number of lynxes increased tenfold in the Rumanian Carpathians; in the course of 1960–1963 1,000–1,300 individuals were registered every year.

After World War II, a westward expansion of the lynx began. In Rumania, it repopulated the Apuseni Mts. (the Transylvanian range) and was seen even in the Banat Plain. From the W. Carpathians it penetrated into Moravia and some strays occurred as far as W. Bohemia, Germany, Austria and, perhaps, Switzerland (Kratochvíl 1968).

In order to ascertain whether at that period the lynx penetrated to the territory of the Hungarian People's Republic, I applied to my friends in Hungary. They unambiguously confirmed that after World War II no data are available on the occurrence of lynxes. As far as the southern part of Hungary is concerned a written communication was sent to me by the Academician Prof. Dr. G. Kolosváry (Szeged). In regard of the northern part of the country I was informed by Dr. A. Kevé (Budapest) in a similar way. No data on the occurrence of the lynx after World War II can be found in the letters by Dr. J. Szunyogh (Hungarian National Museum, Budapest). Similarly, Mr. S. Palásthy, Director of the Forest Management at Sárospatak (Zemplénhegység-i állami erdőgazdaság), reports: "...vom Vorkommen des Luchses auf dem Gebiet unserer Wirtschaft (Komitat Zemplén und Abauj), resp. Ungarns haben wir keine Kenntnis..." ["...we have no information on the occurrence of the lynx in the territory of our Management, and if you like, in the whole territory of Hungary..."]. It is evident from all these data that the eruption in the number of lynxes in the whole area of the Carpathians leading to the westward invasion of this carnivore to areas in which it had been extinct (Kratochvíl 1968) in the past, was not reflected either in the Pannonian lowlands or in the northern mountainous and wooded area of the Hungarian People's Republic. I have no explanation for the fact that in the course of 1946–1960 the lynx penetrated to Moravia, Bohemia and the neighbouring countries from the territory of the W. Carpathians and not southward, to Hungary.

I am greatly indebted to Dr. J. Szunyogh (Budapest) for several data, evidencing, with utmost probability, the last occurrence of the lynx in the Hungarian People's Republic. It is obvious that the last decade of the 19th century and the first of the next one are a period of a complete disappearance of the lynx from the territory of the present Hungarian People's Republic. Ancient records inform us that this carnivore had lived in many places of the country, mainly in the north. Its existence was well known in the environs of Visegrad in the Danube bend, in the 16th century (Szalay 1919). Similarly, it was frequent in the environs of Pannónhalma in the area of Bakonyerdő as late as the 18th century (Szalay 1919). In the Hungarian hunting journal

Vadász Lap (1896—1907), there are notes on the capture of lynxes in the county of Borsod. These lynxes were presumably killed in the area of the mountain ridge Bükk Mts. as evidenced by the capture of a lynx in 1907 and registered by VÁSÁRHELY (1915). It is possible that at that time, scattered lynxes occurred even in the range of the Mátra Mts., and in the southern areas of the counties of Abauj-Torna and Zemplén (ANDREE 1887). (The northern part of this mountain range belongs to Slovakia at present.) Still later on, in the winter of 1915, a lynx was killed in the range of the Pilis Mts. in the SW. Danube bend (HEGYALJAI 1915). This seems to be the last known record of this carnivore taken in the territory of the present Hungarian People's Republic. At present, the lynx is extinct in the territory of Hungary.

In the Hungarian National Museum in Budapest 19 specimens are deposited, captured in the course of 1862—1943 in the Carpathian area. None of them was taken in the territory of the present Hungarian People's Republic. Some evidence of the extinct Hungarian lynx population may perhaps be found in any of the provincial museums or school collections in Hungary.

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History of Occurrence of the Lynx in Bohemia and Moravia

The last reports on the occurrence of the lynx in Bohemia and Moravia in the period prior to World War I are those from 1912—1928 (Bernartzik 1928, Nobel 1942). They reported on the occurrence of the lynx in the forest district Mohelnice lying on the slopes of Mt. Travný, as well as in the forests in the valley of the Ostravice River in the Moravskoslezské Beskydy Mts. At the same time, they are the last reports on the occurrence of the lynx in Moravia prior to World War I. In Silesia, the last lynx taken was considered to be the individual killed in the locality called "Wiesenberg" in the district of Opava in 1909; in Bohemia, the individual coming from the environs of Tábor, killed in 1835 and exhibited in the collections of the National Museum in Prague.

These facts are a sorrowful evidence of many years of struggle between man and an animal species whose activity in nature has mostly been at discordance with the economic and other interests of man.

The abundance of literary records and reports in archives kept in Bohemia and Moravia enables us to compile the history of the process of disappearance of the lynx from the natural land gradually transformed into the cultivated land. Naturally, a similar process has taken place one way or another in many countries of southern, western and central Europe. It is taking place even at present wherever the lynx still occurs, and will go on if protective measures are not taken to save this animal species.

We are aware of the fact that we could not have utilized all sources of information, provided by State Archives, records in various chronicles as well as the entire literature since the invention of printing. In the bulk of archive and other material that had accumulated in our archives, libraries and other collections for centuries, there still are many facts which we failed to uncover. In our opinion, the future will reveal many additional data that will supplement to the present outline of history of the disappearance of the lynx from Bohemia and Moravia; we are satisfied, however, that the essential facts, presented in this paper, will remain unchanged.

We have found reports on the occurrence of the lynx in the past scattered all over the territory of Bohemia, Moravia and the Czech part of Silesia. We obtained these reports in 82 localities. Some of them are actual records of the last occurrence of the lynx in various localities; in other cases it may be presumed that in those localities the lynx occurred even later on; however, we found no subsequent reports on the occurrence of the lynx in these localities. Hence, all dates stated in the present paper may not be considered the latest dates of existence of the lynx in the respective localities.

Material and methods

We derived our information from the literary data on the occurrence of the lynx in Bohemia and Moravia in the past centuries. At the same time, we contacted some of the State and other Archives to collect the data contained in their documents. From the material obtained in this way, one of the authors (F. Vala) compiled a two-volume list of references for the use of the Institute of Vertebrate Zoology, ČSAV. This material was then evaluated, supplemented and compiled in the present paper by J. Krato-

chevil with the aim of describing the process of disappearance of the lynx from Bohemia and Moravia and elucidating its causes.

It is our pleasant duty to thank all institutions and persons who assisted us in this difficult and time-consuming work. Our particular thanks are due to the Management of State Archives at Jindřichův Hradec, Jablonec n. N., Klášterec n. O., Zámuky, Krivoklát, in Brno, at Zámorsk. Opava, Olomouc, Kroměříž, Opočno and in Prague, who showed much understanding for our efforts, contrary to some other State Archives in our country. Some of the data were submitted to us by the State Institute for Forestry Projects and by the Department of History of the Ministry of Agriculture and Forestry.

Results

History of disappearance of the lynx from individual parts of Bohemia and Moravia

Many reports on the occurrence of the lynx in the historical period have been preserved in S. Bohemia, where estate holders devoted great attention to game animals and, hence, also to beasts of prey. Among the latter, the lynx occupied one of the foremost places next to the wolf and was therefore killed with the use of all possible means. This is evidenced by the fact that in all localities, in which records on the occurrence of the lynx are available, there are also available reports on the bounties disbursed by the owner of the hunting rights to those who had killed a lynx. In S. Bohemia, these bounties were fairly high. At Hluboká (3)* in 1677, the noblemen of Schwarzenberg disbursed one taler and 3 kreutzers. The estate holders at Vimperk (10) disbursed 3 florins for a killed lynx in 1751. In spite of this, lynxes were abundant in S. Bohemia for a long period of time. There are more complete data on the occurrence of lynxes in two localities of the Třeboň and Budějovice basin, viz., Třeboň (2) on the Lužnice River and Hluboká (3) on the Vltava River. In the estate of Třeboň (2), 30 lynxes were killed between 1612 and 1660; 36 lynxes, between 1701 and 1750 (K o k e š 1961); and 13 lynxes, between 1815 and 1824. For this reason, the number of lynxes decreased there very rapidly. The latest available report on the killing of a lynx near Třeboň is from 1824. There are no more data on the occurrence of lynxes near Třeboň after that year. In 1622, lynxes were fairly common in the estate of Hluboká (3); therefore, the owners (noblemen of Schwarzenberg) ordered their killing. A bounty for a killed lynx was disbursed still in 1677 but after that year there are no more reports. Possibly, in the vast estate of Hluboká the lynx had been exterminated sooner than in the surrounding ones due to the fact that the noblemen of Schwarzenberg at Hluboká paid much attention to the organization of gamekeeping in their estate. In the nearby estate of Bechyně n. L. (4), a bounty was still disbursed in 1727. In the environs of Tábor (5), the last lynx was killed as late as 1835 (Plate I). This is the latest evidence of the occurrence of the lynx in Bohemia. More to the east, in the estate of the noblemen of Jindřichův Hradec (1), the lynx occurred as well but there are only scarce data on its occurrence and abundance there. Thus we found, for instance, that lynxes were hunted there in 1564; the archive contains a note on a lynx killed as late as 1689.

*) Numbers following the names of localities indicate the respective localities in the attached map, Fig. 7.

The Šumava Mts. (Bohemian Forest) and their foothills used to be a storeroom of lynxes. In several places, the lynx survived there until the 19th century: in the estate of Český Krumlov (6), until 1805; at Želnavá (7), until 1801; at Boubín (9), until 1801; at Vimperk (10), until 1802; and at Kout na Šumavě (15), until 1814. The latest records on lynxes in the estate at Volary (8) are from 1730; in the estate of Chudenice near Klatovy (14), from 1689; and in that of Lčovice near Prachatice (11), as early as 1553. These ancient dates may be presumed not to reflect the actual state and probably, the lynx occurred there even later on. At any rate, in the Středočeská vrchovina (central Bohemian Highlands) near Putim (12), lying more to the north, a lynx was taken as late as 1808, and lynxes were no rarity in the environs of Písek (13) in 1739.

The abundance of the lynx in the Šumava Mts. (Bohemian Forest) and its foothills is evidenced by the data in the files of the Main Office of the Schwarzenberg estate at Český Krumlov (6), stating that the following numbers of lynxes were delivered to the Forestry Office at Český Krumlov (6):*) 30 lynxes between 1603 and 1649, 26 lynxes between 1690 and 1719, 15 lynxes between 1726 and 1730, 34 lynxes between 1731 and 1740, 24 lynxes between 1743 and 1768, and 3 lynxes between 1801 and 1805.

In that archive material, we found incomplete records of 130 lynxes having been taken between 1603 and 1805, that from 1805 being the latest record of the presence of the lynx in the area of Český Krumlov. This review tends to reflect the actual numbers, as the Schwarzenbergs of Český Krumlov used to take great care of their game. The high numbers of lynxes taken indicate that in the forest estate of Český Krumlov, the lynx used to be hunted for very intensively. Occasionally, whole lynx families were killed. In spite of that, the lynx resisted these efforts of man until 1805. A similar situation can be derived from a list of game bags obtained in the estate of Vimperk (10). During the period between 1713 and 1802, a total of 109 lynxes were taken. In our opinion, some additional lynxes killed in that area were not included in these lists, as evidenced by the record on a lynx killed in the "Müllerschlag" hunting ground near Vimperk in 1794. A lynx was also killed in the "St. Thomas" hunting ground in 1776. In the "Borové" hunting ground, three lynxes were killed in 1777 and another old lynx in 1796. *etc.**) The carefully compiled Vimperk list of game bags taken within a period of 90 years indicates that in the area of Vimperk, the lynx used to be fairly common but systematic killing resulted in its extinction. In 1802, two lynxes were taken there and since that time there are no more reports on its occurrence. For the time being, no such accurate records are available on other localities of the Šumava Mts. (Bohemian Forest). Hence, it is difficult to decide as to the time in which the lynx disappeared from the Šumava Mts. (Bohemian Forest) and its foothills. The latest dates available on both the Bohemian and the Bavarian side (Floericke 1927) indicate that in this part of Europe, the lynx definitely disappeared in the thirties of the 19th century, having survived much longer on the other side of the Danube River, in the foothills of the Alps.

So far, reliable data on the occurrence of the lynx in the remaining part of the Bohemia-Bavaria border are scarce. At Čerchov near Domažlice (16), a lynx was taken in 1830. However, it is probable that in that area the lynx occurred even later on and that the record from Čerchov is not the last one.

*) Kokeš (1961) obtained much the same data through excerption of forestry and gamekeeping accounts. In the estate of Český Krumlov, he counted 122 lynxes between 1610 and 1810; in the estate of Vimperk, 117 lynxes between 1721 and 1800. His statements fully corroborate our conclusions.

In the Slavkovský les Forest, not far from Mariánské Lázně, the lynx is known to have occurred near Teplá (18) in 1677. As for the occurrence of the lynx in the estate of Toužim (17), there are records in the archive material that still in 1708 and, later on, in 1734, a bounty of 2 florins and 30 kreutzers was disbursed for a killed lynx. At that time, lynxes were no exception in the area of Toužim. The local frequent occurrence of the lynx in W. Bohemia is evidenced by the § 30 of the Imperial Instructions of 1732, issued at Klášterec n. O. (20), ordering the killing of lynxes.

From the area of the Krušné hory Mts. (Erzgebirge Mts.), three records are available on the Bohemian part: In the estate of Kraslice (19), one lynx each was killed in 1810 and 1815; in the area of Mt. Vysoký sněžník (22), lynxes were killed several times, the latest record being from 1810; the latest record of a killed lynx is that from 1830 at Doupovice (21). All the remaining records on the occurrence of the lynx in the Krušné hory Mts. (Erzgebirge Mts.) and the adjacent areas on both the Bohemian and the German side are of earlier dates. Thus, *e. g.*, the latest record from the Smrčiny Mts. (Fichtelgebirge) is from 1774. In Saxonia, the lynx was included among the game animals still in 1717 (Floerickc 1927) but disappeared quickly later on.

The Děčínské stěny Cliffs was an important area in which the lynx occurred in the past. Between 1645 and 1689, *i. e.*, within the span of 45 years, six individuals were taken in the area of Děčín (23). In the archive material, there are individual records up to 1794. After that year there are no more reports on the occurrence of the lynx in that area. On the Saxon side of the sandstone ridge along the Labe (Elbe) River, the last lynx was killed at the village of Hinterbermsdorf in 1743. An effigy of that lynx was carved in the "Luchsstein" rock to commemorate that event (Floerickc 1927). Very likely, the lynx had been exterminated in the area north of the Labe River earlier than that. In the estate of Česká Kamenice (24) the lynxes were frequent until late 17th century. Records on lynxes taken are available from 1674, 1679, 1681, 1686 and 1688, amounting to one to five individuals a year. As far as we could ascertain, the record on the lynx killed in 1688 is the latest one.

Only a few records are available on the occurrence of the lynx in the entire area of C. Bohemia although they are known to have occurred close to the gates of the Prague Castle (30) in 1236, in the early days of the Přemysl dynasty. In 1268, King Přemysl Otakar I ordered that the lynxes be trapped in every village, thus evidencing that they were abundant at his time. Also, disbursing of bounties for a killed lynx started at that time; thus *e. g.*, by order of King Vladislav II, around 1500, the bounty amounted to 20 groschen. For this reason, the lynx soon disappeared from C. Bohemia. In 1764, the lynx occurred at Mšec (25) near Nové Strašecí, but in the area of Rakovník (27), it was recorded in the 15th, 16th and 17th century (Kočka 1936), the latest record on a lynx killed there being that from 1690. Similarly, the last lynx in the district of Louny was taken at Postoloprty (26) in 1672, in which time a bounty was still disbursed. In the estate of Smečno near Kladno (29), a bounty of a fourscore of groschen was disbursed still in 1649. Very valuable data were derived from the archive of the estate of Krivoklát (28) deposited in the State Archive in Prague. Within the decade of 1690—1699, 17 to 18 lynxes were taken in the above estate, amounting to one to two lynxes a year. The last lynx of the area of Krivoklát was killed on 12 April, 1699, as there is no more recent record. For instance, the lynx is not mentioned in the list of game shot in 1715 (State Archive in Prague, a written communication by J. K. R a y m a n, S. A. I. 61). This tends to indicate that from C. Bohemia, the lynx disappeared in late 17th century although some stray individuals were killed there at times, such as at Žampach (31) in 1767.

From the entire lowland area along the Labe River up to elevations of about 300 metres there are only very scarce data on the occurrence of the lynx. In 1543, a lynx

is mentioned from the estate of Český Brod (32). Similarly, in the estate of Opočno (39), the lynx occurred in the 16th century. As evident from the Instructions issued at Poděbrady (33), lynxes inhabited the Labe Lowlands still at the beginning of the 17th century, as the above Instructions from 1613 charge the inhabitants with a duty to kill lynxes. Besides, the occurrence of the lynx in that area is evidenced by a lynx killed at Lipník near Benátky n. Jiz. (34) in the 17th century. Apparently, the extinction of the lynx in the Labe Lowlands can be dated back to the first part of the 17th century, i. e., a century earlier than in S. Bohemia, as during the second part of that century the lynx was virtually extinct in the Labe Lowlands. That lynxes were fairly abundant in some parts of these Lowlands is evidenced by a report on Lord Jindřich of Hradec (38), dated back to the 15th century, according to which Lord Jindřich took a fancy to hunting for lynxes.

In the foothills of the Lužické hory and Jizerské hory Mts. as well as in those of the Krkonoše Mts. (Giant Mts.), the lynx occurred in the 17th and still in the 18th century. In the area of Mnichovo Hradiště (35), a fairly high bounty of 3 florins and 30 kreutzers was disbursed for a killed lynx still in the 18th century. The same bounty was disbursed even in the estate of Jablonec n. N. (36) around 1700. From that year there is a record on 39 lynxes killed in the Frýdlant projection (37), evidencing that between the 17th and 18th century, the lynx was no rarity in that area. At that time, the lynx also inhabited the areas north of the Bohemian border, as Pax (1921) mentions a lynx killed in the environs of Görlitz in 1740. Hence, it is surprising that for the present there are no data available on the occurrence of the lynx in that area of Bohemia of more recent time. In our opinion, the lynx survived some 100 years longer in the area of the Krkonoše Mts. (Giant Mts.) than in the Labe Lowlands and that it was exterminated there during the 18th century. The lack of available data from the area north of the Labe River, in particular from the Krkonoše Mts. (Giant Mts.), cannot be explained but by the fact that there the lynxes were killed very early and that, consequently, their number was low in general. Perhaps the higher density of the population and the more intensive cultivation of the land contributed to this process.

A similar situation can be observed in E. Bohemia. Apart from a note on Lord Jindřich of Hradec (38) from the 15th century and a record on the occurrence of the lynx in the estate of Opočno (39) in the 16th century, we found a record at Chrudim (40) stating very high numbers of lynxes still in 1650. It may be expected that additional data will be discovered in the archives. The lynx may be presumed to have become extinct in E. Bohemia during the 17th and early 18th century. This is corroborated by the situation found in the Českomoravská vrchovina (Bohemia-Moravia Highland) south of Třebovské mezihoří.

As mentioned above, no recent data are available on the occurrence of the lynx in the area of Jindřichův Hradec (1) where the level of gamekeeping was very high. A similar situation is found in the estate of Telč (44) where there is a single record available, dating back to 1590. Similarly, from the area of Jihlava (42) there is a single record in the "Chronik der königlichen Stadt Iglau" (1402—1607) on two lynxes taken in 1562, with a note stating that lynxes had never been reported in that area prior to that year. The scarcity of the lynx in the Českomoravská vrchovina (Bohemia-Moravia Highland) at that time is also evidenced by the fact that both the above lynxes from Jihlava were presented to Lord Zacharius of Jindřichův Hradec, residing at Telč (Canon 1927). In the Českomoravská vrchovina (Bohemia-Moravia Highland), the lynx occurred even later on although infrequently. Apparently there were stray individuals having migrated from the Carpathians or from the Šumava Mts. (Bohemia Forest). Thus, one lynx was taken near Nedvědice at Velké Meziříčí (45)

in 1734; another one was taken in the estate of Brtnice (43) near Jihlava in 1740; and, apparently, one of the latest records is that of a lynx taken at Strážník near Větrný Jeníkov (41) in 1741. In the lists of game bags, the lynx is mentioned in the estate of Polička (46) in 1706. That in the 16th century the lynx was fairly numerous in the northern part of the Českomoravská vrchovina (Bohemia-Moravia Highland) is evident from the Instructions issued by the Archbishop Vilém of Olomouc in 1570 for the estate of Svitavy (47), ordering lynxes to be killed.

From the lowland part of S. Moravia the lynx disappeared very early, as evident from the records on lynxes in the environs of Mikulov (48) in 1638, and Lednice (49) in 1690. So far, there are no more recent records available for this area. In the environs of Brno (50), the latest report available is that on a lynx taken in the municipal forests in 1570. In the materials obtained from the estate of Vranov near Brno (51), there are records on a bounty of one florin disbursed for a lynx killed in 1654. At Blansko (52), there is a record on a lynx taken in 1670. All these facts tend to evidence that in the lowland part of Moravia, the lynx was exterminated very early, very likely already during the 17th century, similarly as in the Labe Lowlands. In S. Moravia, the lynx probably survived longer, as the lynx population in that area may be presumed to have been supplemented by individuals migrating there from the Carpathians.

During the first part of the 18th century, the lynx probably disappeared from the Moravian Karst and the Drahanská vysočina Upland as well. This is evidenced by the record on a lynx taken in the estate of Rájec (53) in 1750 as well as by the data from the estates of Plumlov (54) and Bouzov (55). Of particular importance are the continuous records on game bags taken and on bounties disbursed in the estate of Bouzov, covering the span of 1763 till 1894, i. e., 131 years. The lynx is absent from these records. Hence, it is inferred that it had been exterminated there prior to 1763. Also, the lynx is not mentioned in the list of bounties in the estate of Plumlov (54); hence, it is inferred that in that area the lynx had been exterminated prior to 1762.

Still earlier, the lynx disappeared from the lowland part of C. and N. Moravia. This fact is of considerable importance, as the lowland parts of C. and N. Moravia are wedged in between extensive wooded areas and are neighbouring with the Carpathians. In the excerpts from the forestry and gamekeeping accounts of the estate of Lipník n. B. (56), made by Prof. Dr. A. Zlatník, of the University of Agriculture in Brno, there is no record at all of a lynx in the almost complete series of records from 1650 till 1823. In its most part, the estate of Lipník n. B. lies in the lowland part of C. Moravia. Also, the list of bounties disbursed in the municipal estate of Olomouc (57) does not mention a bounty disbursed for a lynx already at the end of the 17th century. Also, the lynx is absent from the continuous series of lists of game bags obtained in the estate of Haňovice near Olomouc (58) during 1683 till 1928 (i. e., 245 years) as well as from the list of bounties disbursed. Hence, it is presumed that in the lowland part of C. and N. Moravia the lynx was exterminated during the 17th century.

Beyond doubt, the lynx used to be very frequent in the mountainous part of N. Moravia, as can be derived from the above-mentioned Instructions of the Archbishop Vilém of Olomouc, issued in 1570 and charging the estates of Zvole (59), Mírov (60) and Bludov (61) as well as other estates with the duty of killing lynxes. However, there are no more recent facts available, enabling us to determine the time in which the lynx was exterminated in that area. The data on game bags obtained in the estate of Mírov during 1804 till 1910 provide a safe evidence that in that time the lynx occurred there no more. Also, the data from the surrounding areas tend to indicate that this process had taken place there during the 18th century, as in the estate of Rudoltice (62) a lynx was taken in 1775; in the estate of Loučná n. D. (63), in 1770; in the estate of Branná

(64), a lynx is mentioned at the beginning of the 18th century, etc. In Mt. Praděd (Altwater), the highest mountain of the Jeseníky Mts. (65), a lynx was taken in 1740. Important data were derived from the archive of the estate of Janovice near Rýmařov (66). From the accounts from 1690—1745 (i. e., a period of 55 years) as well as from the municipal account it was possible to derive records on one lynx shot in 1683 and two lynxes shot in 1694. Apparently, the lynx was scarce in that area at that time. Hence, it is possible to infer that in the entire northern part of Moravia, including the mountainous areas, the lynx was exterminated during the 18th century, namely in its first part.

The lynx survived longer in the Silesian part of the Jeseníky Mts. In the archives of the estate of Karlovec (67, district of Bruntál), the lynx is mentioned in the list of bounties still in 1805, suggesting that at that time the lynx was a frequent game animal in those parts. A similar situation was in the estate of Bruntál (68) where the instruction on killing lynxes was still valid in the first part of the 19th century. The last lynx was killed there in 1852. This is the latest known record of a lynx, probably belonging to the local population, in Moravia outside the Carpathian Region. More to the north, near the Polish border, in the area neighbouring with the lowlands of Upper Silesia, the lynx disappeared probably a little earlier. In the files of the estate of Krnov (69), the lynx is not mentioned in the lists of game bags obtained between 1804 and 1909, i. e., in 105 years. The lynx was very likely absent from that area in the 19th century, similarly as from the environs of Jeseník (Gräfenberg) and Zlaté Hory (70) where it is known to have occurred in the 17th and 18th century. According to Pax (1921), a lynx was taken in the estate of "Groß-Strehlitz" in the Chelms Hills on the right bank of the Odra River around 1800. Another lynx, taken on the Tarnovice Plateau near "Neudeck" in 1897, is considered by Pax (*l. c.*) to be a stray individual having migrated there from the Beskydy Mts.

Individual subsequent records on lynxes taken in the Moravian and Silesian part of the Sudetes are quite singular and apparently pertain to individuals having migrated there from the Carpathians. Such is the case of the lynx taken in the hunting ground "Wiesenberg" in the area of Opava (71) in 1909. The local populations of the lynx in the Hercynian part of Moravia were exterminated during the 17th, 18th and early 19th centuries. The lynx taken at Bruntál (68) in 1852 can probably be considered the last member of these populations.

In the Carpathian part of Moravia east of the Morava (March) River and south of the lower reaches of the Bečva and Odra Rivers, the expulsion of the lynx by man was influenced by the influx of lynxes from Slovakia. The Moravian population of the lynx was repeatedly reinforced by individuals having migrated here from the neighbouring Slovakian mountains. Such migrations were probably irregular. In the nineties of the last century, a migration wave could be observed in E. Moravia. The possibility for the existence of such a wave was suggested by Floericke (1927). Thus, a lynx was taken in the environs of Valašské Meziříčí (79) in 1745 and again as late as 1893. In the area of Holešov (80), a lynx was taken in 1888 and additional three individuals in 1898. In the environs of Vsetín (81) there is a record on a lynx taken in 1780; in the environs of Pitín (82) on the Moravian side of the Bílé Karpaty Mts., a lynx was killed in 1888. Many records on lynxes taken are available in the nineties of the last century from the Moravskoslezské Beskydy Mts. In 1898, a lynx was killed at Staré Hamry (76); in 1891, on Mt. Lysá Hora (74); in 1890, 1891, 1893 and 1894, lynxes were taken in the environs of Ostravice (75). In those years the lynx occurred even in the environs of Frenštát p. R. (78); there is a record from 1891.

Towards the end of the nineties of the last century, this migration wave ceased and in the beginning of the 20th century, the lynx was considered extinct in E. Moravia.

Subsequent individual lynxes killed or observed in free nature were very likely exclusive cases of individuals having migrated from Slovakia. It is difficult to think of another explanation of how the lynx could have escaped the notice of the hunters and gamekeepers of E. Moravia under the high level of gamekeeping. Among these migrating individuals it is necessary to include those taken in the area of Těšín (72) in 1908, in the forest district of Mohelnice in Mt. Travný (73) in 1912, near Ostravice (75) in 1913 and near Staré Hamry (76) in 1914. In the forests around Ostravice (75), two lynxes were sighted again in 1928. This is the latest record on the occurrence of the lynx in the Moravskoslezské Beskydy Mts. prior to World War II, after which a new migration wave of lynxes coming from the east to E. Moravia has taken place (Kratochvíl 1968).

In the foothills of the Beskydy Mts., in the valley of the lower reaches of the Bečva River, lynxes were not seen for three centuries, as evident from the above-mentioned data on the estate of Lipník n. B. (56). The archive material from the estate of Hukvaldy (77) in the valley of the Odra River shows a similar situation: not a single lynx has been mentioned in the lists of game bags taken between 1846 and 1944 although it had been frequent there in the 16th century so that the tenants were charged with the duty to kill lynxes according to the instructions issued by the landlord. Nevertheless, the lynx is known to pass these areas, migrating from the Carpathians to the eastern part of the Sudetes, as evidenced by the individuals killed near Opava (71) in 1909 and after World War II.

Causes of disappearance of the lynx from Bohemia and Moravia

The lynx has disappeared from Bohemia and Moravia like from many countries of western, central and southern Europe, and that is not due to its biological properties. The lynx is a species very dynamic in biological respect, showing very wide ecological valency. It can readily become adapted to environmental conditions and even to the presence of man under natural conditions. Hence, the causes for the disappearance of the lynx in our country must be sought for in the conditions of its outer environment. To detect them retrospectively is no more possible; therefore, one cannot do without conjectures and suppositions. One may agree that there has not been a single condition but a series of factors that decided; in some periods, one of them might have prevailed and in others, another again. The same may be presumed for different areas and different parts of Bohemia and Moravia. However, all of these factors belong to the anthropogenous ones. The following are the most important ones:

(a) Since the time in which hunting became the exclusive right of those who held the power (above all, the secular and ecclesiastical nobility), the interest in game animals increased and, consequently, also the control of their predators was intensified. The tenants, devoid of the right to hunt for game animals, were instructed and ordered to destroy beasts of prey, above all, wolves and lynxes. The lynx was eradicated by virtually all means and everywhere. To increase these efforts, killing a lynx was rewarded by a bounty, mostly fairly high for that time. Apart from that bounty, many estates also purchased lynx furs, thereby still increasing the interest of the tenants. This phase of extermination of the lynx can be observed mainly in the 16th and 17th centuries but its effects continued in the 18th and 19th centuries and are continuing, in an altered form, even in the 20th century.

(b) During the 15th to 17th century, farm animals were kept in their pastures throughout the growing season of the vegetation as a rule. Consequently, they were exposed to the attacks of large carnivores including the lynx. That is why the reports

are so frequent on the losses caused by the lynxes among the farm animals, above all, sheep. Later on, losses among farm animals caused by the lynxes have been described in those countries in which keeping farm animals in the open throughout the growing season was as common as in the Alpine countries. This circumstance, too, was the motive power that accelerated the process of extermination of the lynx, above all, in the areas of advanced agriculture and more densely populated ones. In the period of introducing new agricultural procedures and new crops (e. g., the so-called clover revolution after 1734; the arrival of the potato culture after 1750; the arrival of the maize culture and sugar beet culture, etc.) and passing to keeping farm animals in sheds, the lynx had been virtually extinct or on the verge of extinction in the cultivated areas.

(c) Hand in hand with these circumstances, the advances in the development of weapons used in hunting played an important part in the process of extermination of the lynx. The primitive popular ways of hunting ceased, in the 15th century, to the use of shotguns and rifles, fairly common already in the 16th century. The invention of firearms, together with the right of hunting for game animals, organized control of predators (particularly where gamekeeping reached a high level) and efforts to decrease the losses among farm animals kept in the open throughout the growing season, are the main causes for the disappearance of the lynx.

(d) To the decrease in numbers of the lynx contributed also the change in the structure of the vegetational cover of our country, being transformed into cultivated land hand in hand with increasing population density. In the prehistoric period and still at the beginning of the historic one, the entire area of our country was covered with forests and, according to Pax (1921), the lynx was one of the members of the so-called "Eichhörnchenzeit", being a member of the postglacial forest fauna. Only the highest peaks of the mountains and stony areas were free of forests. In that period, the lynx inhabited the entire territory of Bohemia, Moravia and Silesia. With the colonization of the country, the forest disappeared in the environs of human settlements, particularly in lower elevations with the most fertile land. Due to increasing population and increasing demand for grazing areas, the deforested areas increased and fused. For this reason, the lynx disappeared first in the lowlands and the most densely populated areas (C. Bohemia, Labe Lowlands, lowlands of Moravia) during the 16th and, above all, 17th century. During the Middle Ages, the process of deforestation comprised the highlands and foothills and, later on, even the mountains. A real ruin of our forests resulted from the increased demand for charcoal, especially at the beginning of the modern time. The lynx disappeared from our country hand in hand with the disappearing forest. Later on, the increased demand for timber resulted in increased attention being paid to the forest, but then the lynx was extinct in most of our country. Consequently, the process of disappearance of the lynx was not markedly affected by the subsequent large-scale forestry started after 1720, even if the latter favoured the extermination of the lynx.

(e) In Bohemia and Moravia, the extermination of the lynx was assisted by the widespread habit of creating game preserves and pheasantries as means for large-scale production of game. Naturally, the high numbers of game animals concentrated to small areas attracted carnivores adapted to the forests by their way of life, the more so as outside the preserves the forests were destroyed and in the preserves both the game and the predators could find undisturbed conditions of life. Hence, in the archives from the 17th and 18th centuries, one frequently finds reports on considerable numbers of lynxes killed in the territories of such estates that possessed preserves, often mentioning whole lynx families being killed in them. Such reports can be understood only if considered from the point of view of the contemporary habit of keeping game animals gregariously in the preserves. That the latter was no exception is evident from the fact

that Vodička (according to the manuscript) counted 960 game preserves and 920 pheasantries in the territory of Czechoslovakia between the 11th century and 1956. The habit of keeping game animals in preserves decreased at the end of the 19th and, above all, during the 19th century, but at that time the lynx had been extinct in most of Bohemia and Moravia.

The process of disappearing of the lynx from Bohemia and Moravia lasted for about four centuries. How rapidly the lynx has vanished is shown by the records gathered by Kokeš (1961) through excerption of forestry and gamekeeping accounts in the estate of Český Krumlov (southern Bohemia):

- 21 lynxes killed between 1751 and 1760.
- 10 lynxes killed between 1761 and 1780.
- 12 lynxes killed between 1771 and 1780.
- 10 lynxes killed between 1781 and 1790.
- 7 lynxes killed between 1791 and 1800, and
- 3 lynxes killed between 1801 and 1810.

This review shows how rapidly the numbers of lynxes decreased even in such richly wooded areas as S. Bohemia. In the period of growing usage of modern methods of agriculture, animal husbandry and forestry as well as of highly efficient firearms, and when keeping game animals in preserves decreased, the fate of the lynx in Bohemia and Moravia had long been decided upon: the lynx had been extinct or on the verge of extinction.

In Czechoslovakia, the lynx succeeded to survive only in the Slovakian Carpathians where the above conditions were not as intensive as in Bohemia and Moravia. Its survival has been favoured by the large mountain forests and, since 1934, also by the legal protection of the lynx, the aim of which is to find a balance between the economic and cultural interests to prevent the lynx, an autochthonous large carnivore of our country, from total extinction.

Conclusions

The lynx, *Lynx lynx* (Linnaeus), is an autochthonous species of C. European fauna. The environmental requirements of this species have encountered with the economic interests of man. The lynx has been exposed to heavy killing to control its numbers and, as a result, it began disappearing from the country, the natural character of which has been transformed to cultivated land by the activity of man. In Bohemia, Moravia and Silesia, the process of disappearance of the lynx lasted four centuries. The following are the main factors responsible for the disappearance of the lynx:

- (a) killing the lynx as a predator of game animals, especially in the period when hunting was the sole right of the holders of the power;
- (b) killing the lynx as a predator of farm animals kept in their pastures in the period when farm animals were not yet permanently kept in stables in Bohemia and Moravia;
- (c) advanced development of weapons and other equipment used in hunting;
- (d) increasing population of the country, resulting in decreasing acreage of forests as the natural environment of the lynx; and
- (e) extensive keeping of game animals in preserves and pheasantries, the number of which in Czechoslovakia was 1880 by 1956.

Consequently, the lynx disappeared first:

- (a) in fertile lowlands (Labe Lowlands, bottomland areas of Moravia) as well as in strongly and early populated areas (C. Bohemia) in the course of the 16th and 17th centuries;

(b) in highlands and foothills as well as certain mountains that were gradually turned into cultivated land, particularly during the 18th century; and

(c) in mountain areas with large wooded areas during the 19th century.

In Bohemia, Moravia and Silesia, the process of disappearance of the lynx ceased in the first part of the 19th century in the Hercynian part, and during the 2nd part of that century in the Carpathian part of these countries. There, the local populations of the lynx were virtually exterminated. The slower retreat of the lynx in Moravia than in Bohemia may be presumed to be due to constant influx of individuals from Slovakia, supplementing the local populations. Certainly, this influx has not been regular in time: there seem to have been several waves. A suggestion of such a wave appears in the nineties of the 19th century and ends towards the end of that century. In the beginning of the 20th century, the lynx does not seem to have occurred in Bohemia and/or Moravia any more. However, in the years preceding World War I, scattered individuals migrated to E. Moravia from Slovakia, as evidenced by individuals killed or observed in the Carpathian part of Moravia in 1908, 1909, 1912—1914 and 1928. Also, the lynx taken in the area of Opava in 1909 can be included among these migrations. After World War II, a new wave of migrating lynxes has appeared in Moravia (Kratochvíl 1968).

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Fig. 7. Distribution of the Common lynx, *Lynx lynx* (L.), in Czechoslovakia. 1, historical reports between 13th and late 16th century; 2, reports from 17th century; 3, reports from 18th century; 4, reports from 19th century; 5, reports from 20th century prior to World War II; 6, boundaries of the present occurrence of the lynx in Czechoslovakia. — For a review of sources and the last records of the occurrence of the lynx in Bohemia and Moravia as well as the 82 localities in which these data were obtained, cf. the explanatory note in the text at the end of the References.

A survey of sources and latest data on the occurrence of the lynx, *Lynx lynx* (L.) in Bohemia, Moravia and Silesia. Out of several data coming from one place only the latest ones are registered in this list*. Supplementary data to Fig. 7.

(1) Jindřichův Hradec, 1689; A. A. F. — Jindřichův Hradec. — (2) Třeboň, 1824; Chadt (1909), Bieger (1941). — (3) Hluboká /Vl., 1677 — bounty according to A. A. F. — Třeboň (estate of Hluboká). — (4) Bechyně, 1727 — bounty according to A. A. F. — Třeboň (Archives of Hluboká). — (5) Tábor, 1835; Chadt (1909), Janda (1930). — (6) Český Krumlov, 1805; A. A. F. — Č. Krumlov (II.A.7,W); Bieger (1941); Kokeš (1961). — (7) Želnavá, 1801; A. A. F. — Č. Krumlov (IBW). — (8) Volary, 1730; A. A. F. — Č. Krumlov. — (9) Boubín, 1801; A. A. F. — Třeboň. — (10) Vimperk, 1802; Chadt (1909), Čech et al. (1935), Kokeš (1961). — (11) Lčovice near Prachatic, 1553; A. A. F. — Č. Krumlov. — (12) Putim, 1808; Čech et al. (1935), Maximovič (1935). — (13) Písek, 1739; Sedláček (1911). — (14) Chudonice near Klatovy, 1689; A. A. F. — Třeboň, S. A. — Jindř. Hradec. — (15) Kout na Sumavě (Bohemian Forest), 1814; S. A. — Třeboň. — (16) Čerchov near Domažlice, 1830; S. A. — Třeboň. — (17) Toužim, 1734 — bounty according to A. A. F. — Třeboň (I.B.6.W.I.). — (18) Teplá near M. Lázně, 1677; records on killing of animals, Hist. Dep. of M. A. — (19) Kraslice, 1815; Bieger (1941). — (20) Klášterec Olší, 1732; A. A. F. — Č. Krumlov, imp. instruction; 30. Alg. gen. from 1732. — (21) Doupovice, 1830; Čech et al. (1935), Bieger (1941). — (22) Vysoký Smězník, 1810; Bieger (1941). — (23) The area of Děčín, 1794; Michel (1929), Čech et al. (1935), Barta (1954). — (24) Česká Kamenice, 1688; Chadt (1909), Čech et al. (1935), Kočka (1936). — (25) Mšec, 1764; Cabart (1958). — (26) Postoloprty, 1672; Hist. Dep. of M. A., records on killing of animals. — (27) Rakovník, 1690; Kočka (1936). — (28) Krivoklát, 1699; S. A. — Praha, Dep. Krivoklát (sign. NA-Rayman-3798), Nechleba (1934). — (29) Smečno near Kladno, 1649 — bounty according to Chadt (1909). — (30) Praha, 1236; S. A. — Praha, Dep. Krivoklát; Cabart (1958). — (31) Zampach, 1767; S. A. — Praha, Frič (1872). — (32) Český Brod, 1543; according to records by F. Vodička from the book by Persson, the forester, from Poděbrady — 17th century. — (33) Poděbrady, 1613; the same as item No. 32. — (34) Lipník near Benátek; about 1650, according to records on killed animals — His. Dep. of M. A. — (35) Mníchovo Hradiště, in the 18th century according to the bounty, A. A. F. — Frýdlant. — (36) Jablonec/Nis., towards 1700; bounty according to A. A. F. — Jablonec/Nis., — (37) Frýdlant, 1700; A. A. F. — Jablonec/Nis., estate of Frýdlant. — (38) Hradec Králové, 15th century; A. A. F. — Hradec Králové. — (39) Opočno, 1543 and towards 1600; A. A. F. — Český Krumlov (II. A. W. 30 and II. A. 7. 30). — (40) Area of Chrudim, 1650; Český lid, 1905–6 (15). — (41) Strážník near Větrný Jeníkov, 1741. — (42) Jihlava, 1562; Canon (1927); Chronik der königl. Stadt Iglau (1402–1607). — (43) Brtnice, 1740; S. A. — Třebíč, estate of Brtnice. — (44) Hradisko near Mrákotín, estate of Telč, 1590; A. A. F. — Jindř. Hradec. — (45) Nedvědice, 1734; A. A. F. — Opava. — (46) Polička, 1706; Sommer (in: Cabart 1958: 190). — (47) Svitavy, 1570; A. A. F. — Kroměříž, a copy of the Archbishop of Olomouc — instruction p. 232. — (48) Mikulov, 1638; S. A. — Brčclav. — (49) Lednice, 1690; S. A. — Brno, urban chronicle of the Municipal Estates, estate of Lednice. — (50) Brno, 1570; S. A. — Brno, urban chronicle of the Municipal Estates, of the town of Brno, fund F-30 (Liechtenstein). — (51) Vranov near Brno, 1654; archives of the estate of the town of Brno. — (52) Blansko, 1670; A. A. F. — Brno, estate of Blansko. — (53) Rájec, 1750; S. A. — Brno, estate of Rájec. — (54) Plumlov, prior to 1762; missing in the list of bounties. — (55) Bouzov, prior to 1763; missing in the list of killed game animals. — (56) Lipník/B., prior to 1650; According to communication by Ing. Z. Bauer compiled from the excerpt of the accounts of the estate of Lipník/B. by Prof. Dr. A. Zlatník — University of Agriculture — Brno. — (57) Olomouc, prior to 1699; A. A. F. — Olomouc, urban chronicle of the Municipal

* Abbreviations: M. A. — Ministry of Agriculture; S. A. — State Archives; A. A. F. — Archives of Agriculture and Forestry.

Estates of the town of Olomouc. — (58) Haňovice near Olomouc, prior to 1683; urban chronicle of the Municipal Estates of the town of Olomouc. — (59) Zvole near Olomouc, 1570; A. A. F. — Kroměříž, copy of the Archbishop of Olomouc — instruction p. 232. — (60) Mírov, 1570; the same as item No. 59 and the lists of killed game animals. — (61) Bludov, 1570; the same as item No. 59. — (62) Rudoltice, 1775; A. A. F. — Olomouc, estate of Rudoltice. — (63) Loučná/D., 1770; A. A. F. — Olomouc. — (64) Branná, the beginning of the 18th century; S. A. — Brno, fund F-30. — (65) Praděd, 1740; A. A. F. Ostrava, Bieger (1941). — (66) Janovice near Rýmařov, 1694; Hošek (1961). — (67) Karlovec near Bruntál, 1805; bounty according to A. A. F. — Olomouc. Bednář et al. (1963). — (68) Bruntál, 1852; S. A. Opava (fund of the Č. S. R. N. R., Archives, sign. 56 2). — (69) Krnov, prior to 1840; S. A. Opava, fund of Krnov, sign. book No. 9. — (70) Zlaté Hory, in 17th and 18th centuries. — (71) Wiesenberg, 1909; A. A. F. — Opava. — (72) Těšínsko, 1908; Jančík (1957), S. A. (A. A. F.) — Těšín. — (73) Travný, 1912; Nohel (1944), Kux (1955). — (74) Lysá hora, 1891; Chadt (1909). — (75) Ostravice, 1913, 1928; S. A. (A. A. F.) — Ostrava, Bernatzik (1928). — (76) Staré Hamry, 1898, 1914; A. S. (A. A. F.) — Ostrava, Floerickc (1927), Bieger (1941). — (77) Hukvaldy, prior to 1846; S. A. — Opava, fund of Hukvaldy (sign. 231 and 234). — (78) Frenštát p. Radhoštěm, 1891; S. A. — Frenštát p. R. — (79) Valašské Meziříčí, 1745, 1893; Jirsík (1927), Janda (1930), Domluvil (1953-4). — (80) Arca of Holešov, 1888, 1898; A. A. F. — Kroměříž; Janda (1930). — (81) Vsetín, 1780; A. A. F. — Kroměříž. — (82) Pitín, 1888; Chadt (1909), Jirsík (1927).

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Decrease in the Area of the Lynx on the European Territory of the Soviet Union in the Course of the 17th–19th Centuries

In the last thirty years of this century the lynx recovered in many regions of the European part of the Soviet Union where it had been extinct in the past. Nevertheless, its distribution decreased considerably in comparison with that of the 16th, 17th, 18th and the early 19th centuries. The decrease in numbers was especially evident in the forest steppe and in the southern boundary of the forest-covered area.

At present the lynx does not occur in N. Bessarabia, but it was fairly frequent there in the 30's of the 19th century (Nordmann 1840). Nowadays, the lynx is scarce in the Ukraine and it is only distributed in the northern border region of the Ukrainian Polesi and in the Carpathians (Sokur 1961). In the 1830's the lynx appeared in Podoli (Nordmann 1840) and in the 1850's this carnivore was numerous both in the forest and forest steppe regions of Volyn (in the districts of Ovruc, Kovel, Luck, Vladimir Volynskij and Novgorod Volynskij) (Perlstejn 1857). In the district of Tula, lynxes occurred in a small forest clearing of the Odojev region only (Central State Archives — Region of Odojev, volume 96).

In the course of the 20th century, the lynx occurred scarcely in the C. Russian forest steppe; 2 lynxes were observed in the forest area of the Lipeck region in December, 1938; Barabaš — Nikiforov 1957). In the 17th and 18th centuries, the lynx was frequent in many places. We have to mention here the orders of the Muscovian tsar dealing with the hunting of different predators and sent to the districts of Belgorod, Ostrog and some others in the 1660's. The lynx was among the animals mentioned in the orders. A hundred years later, the lynx occurred in the environs of Belgorod as well; in 1766 the district office of Belgorod, answering the inquiry of the Academy of Sciences, reported that lynxes had lived "in a great number" there in the past. (Historical materials of the Voronež department, volume XVI, 1889.)

In the 1770's and 1780's, the lynx was really frequent in the eastern forest area, districts of Moršansk and Sack on the right Oka River bank, as well as along the Lomovis, the V'azl'a and the Vyša Rivers (Kirikov 1959). South of these forests, in the forest of Tellerman on the right Choprór River bank (51° 51' — 51° 30' of the northern latitude), lynxes lived even in the 1850's (Feoktistov 1860).

In the early 18th century, the lynx population was so dense in the forest steppe of Baškiria that the immigrants, allowed by the Baškirian rulers to settle there, were permitted to hunt for these beasts of prey. (Historical materials of Baškiria, 1949.) What are the main reasons for the decrease in numbers of lynxes in the European part of the Soviet Union?

Beyond doubt, this decrease in numbers has been caused by the clearing of forests both in the forest steppe and in the southern borderland of the forest area.

In the forests belonging to the forest steppe area, the lynx does not invariably find sufficient quantity of food as well as adequate shelters for breeding the young. In the E. European forest steppe the decrease in numbers of hares and tetraonids birds especially preyed on by lynxes, is evident in comparison with the preceding periods. In the forest steppe of Belgorod and Charkov snow hares were far more numerous in the 18th and early 19th centuries; at present they are completely extinct here and in the Volga region their number decreased several times.

The number of deer sank rapidly as well and the decreasing number of quiet and remote forests and forest steppes was the reason for considerable shortage of convenient shelters.

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