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NOTES ON SOME LAND AND FRESHWATER MOLLUSCA FROM AUVERGNE, FRANCE

by

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From August 16 till September 1, 1955, Dr. H. C. Blöte, Mr. J. J. Barkman, and the present author were the leaders of an excursion of students in biology of the University at Leiden to Central France. For some two weeks the party was hospitably lodged in the "Station Biologique" in the village Besse-en-Chandesse (département Puy de Dôme), 30 km S.S.W. of Clermont-Ferrand. Thanks to the generosity of Prof. R. Hovasse and Dr. L. Olivier, we could stay in this biological institute, which belongs to the University at Clermont-Ferrand.

During the excursion the author paid special attention to the collecting of land and freshwater Mollusca. The very dry and hot weather during our stay was one of the main difficulties in carrying the project into execution; moreover, the region has a rather poor malacofauna as a result of the nearly complete absence of lime in the soil.

The climate of the here discussed part of Auvergne, the massif of the Monts Dore, is typically Atlantic; the region has a considerable amount of rainfall (1150—2500 mm per annum). The highlands are situated at the northwestern border of the Massif Central, representing an area completely exposed to the northern and western winds of the Atlantic Ocean. The warmest month is August with an average temperature of 14.8° C.

The Massif Central is of volcanic origin; it consists mainly of metamorphous granite, formed during the Lower Carboniferous, on which beds of lava and volcanic ashes were deposited during the Tertiary. The cones of four extinguished volcanoes rise from a slightly undulating table-land of a height of about 1000 m; the highest of these mountains, the Puy de Sancy, attains a height of 1866 m. Mineral sources are the only remains of volcanic

activity nowadays. About 200 small lakes, some of which have now developed into bogs, owe their origin to erosion by Pleistocene glaciers.

In the flora Atlantic elements dominate; the few continental and mediterranean species are only to be found on the eastern slopes that are not very much exposed to rain and winds.

In contrast with the flora, about which in the last thirty years some extensive papers have been published, the fauna and particularly the malacofauna are still poorly studied. There exists only one comprehensive publication about the Mollusca from Auvergne, viz., the book of Bouillet, which was published in 1836 in Clermont-Ferrand. Some scattered notes are to be found in the volumes of the Faune de France that deal with the land and freshwater Mollusca (Germain, 1930-1931).

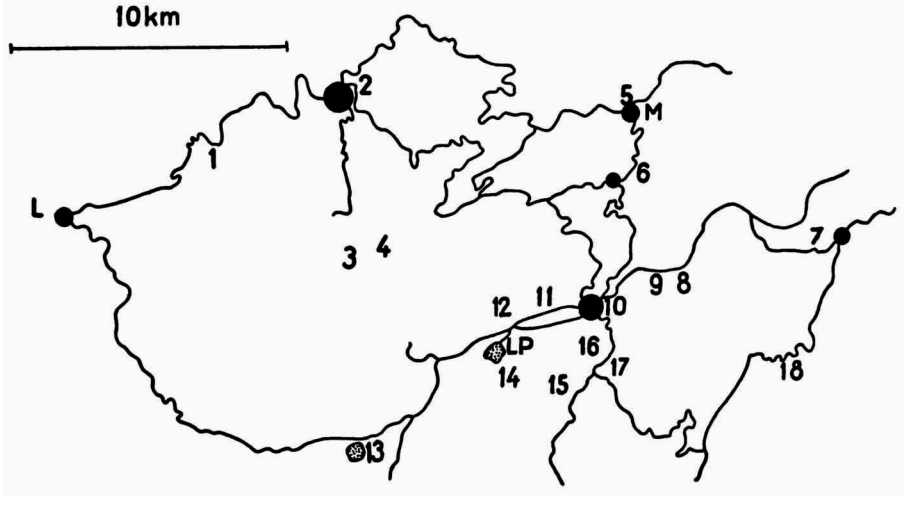

Fig. 1. Situation of the localities. Explanation in the text.

The present collection comprises 45 species only; Bouillet enumerates altogether 101 names. Of these, however, some have to be struck off the list, on the one hand because they have proved to be synonyms, on the other because they certainly refer to species not native in Auvergne, which consequently have been erroneously included in the catalogue of Bouillet. Nothing is known to us about the collection of Bouillet; very probably it has to be considered lost.

The material is preserved in the Rijksmuseum van Natuurlijke Historie at Leiden, registered in the malacological department sub No. 1252; some duplicates are deposited in the author's collection.

The material was collected at the following localities (cf. fig. 1):

1, Bois de Latour, 1100-1200 m;
2, le Mont-Dore, 1100 m;
3, Puy de Sancy, Puy Ferrand, 1846 m;
4, Vallée de Chaudefour, 1100-1200 m;
5, Château de Murols, 850-900 m;
6, St.-Victor, 1000 m;
7, W. of Saurier, 600 m;
8, along Ruisseau de Vaucou near Oursière, 800-900 m;
9, between Besse-en-Chandesse and Bois de Chilozas, 1000 m;
10, Besse-en-Chandesse, 1000-1050 m;
11, in the rivulet Couze, 1000 m;
12, along the rivulet Couze upstream, 1100 m;
13, Lac Chauvet, 1200 m;
14, wood near Lac Pavin, 1200 m;
15, beech-wood E. of Lac Estivadoux, 1200-1300 m;
16, beech-wood S.S.E. of Besse-en-Chandesse, 1000-1200 m;
17, Cascade d'Anglard, 1100 m;
18, Gorges de Courgoul, 600-700 m;
L = Latour d'Auvergne, LP = Lac Pavin, M = Murols.

The species are arranged according to the system in Thiele's Handbuch der systematischen Weichtierkunde (Jena, 1929-1935), except some alterations in accordance with more modern opinions. The identification of the Lymnaeidae, Arionidae, Limacidae, and of the genera *Helicella* and *Cepaea* are partly based on anatomical characters [1]). The publications of Bouillet (1836) and Germain (1930-1931) have been cited under each species.

Gastropoda Prosobranchia

Acme (*Acme*) *dupuyi* Paladilhe, loc. 15, 8 ex. (fig. 2a).
Germain, p. 588.

The specimens were found in a sample of the soil of a beech-wood. *Acme dupuyi* occurs in a rather restricted area, mainly within the boundaries of France; only in the easternmost parts of its range, near Geneva, specimens have been collected in Switzerland (cf. Favre, 1927). This *Acme* is characterized by the nearly complete lack of a cervical ridge somewhat behind the aperture. The measurements of the here discussed shells are 3.0-3.2 ×

1) The author is much indebted to Dr. C. O. van Regteren Altena (Leiden), Dr. F. E. Loosjes (Wageningen), and Mr. J. G. J. Kuiper (Paris) for help with identifications and literature, and for critical remarks.

0.7-1.0 mm, they have 5-6 whorls. Judging by the records in the literature the present specimens belong to a small and slender variety. The shells have a fresh appearance; no remnants of the soft parts, however, could be found in any specimen. They are of a light brown colour, glossy, and very transparent.

Acme dupuyi was not previously mentioned from Auvergne.

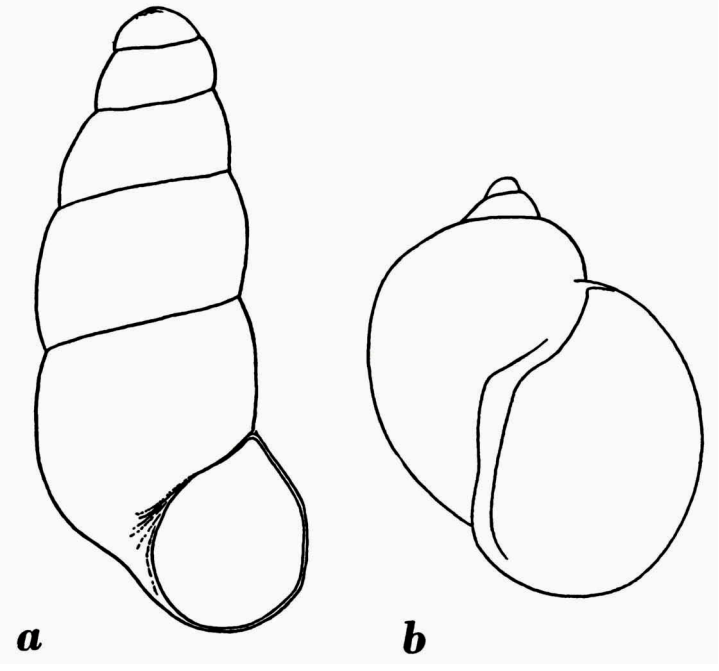

Fig. 2. a, *Acme dupuyi* Palad., loc. 15, actual length 3.1 mm. b, *Lymnaea peregra* (Müll.), loc. 13, actual length 11.4 mm.

Gastropoda Pulmonata

Carychium tridentatum (Risso), loc. 15, 1 ex.

Germain, p. 558.

Not mentioned by Bouillet. The specimen was identified in accordance with the opinion of Watson & Verdcourt (1953).

Lymnaea (*Radix*) *peregra* (Müller), loc. 13, 59 ex. (fig. 2b).

Bouillet, pp. 67-68 (sub *Limnea ovata* and *L. peregra*); Germain, p. 488, p. 494 (sub *Limnaea limosa* and *L. peregra*).

Syn. *Lymnaea ovata* Drap.

The present material was identified on anatomical characters as described by Hubendick (1946, 1951); the population shows a characteristic and con-

stant shape of shell. According to Forcart (1950) this Lymnaeid has to be identified with *Lymnaea balthica* (L.); the name *peregra* is here used because for a considerable time it has been in constant use.

Lymnaea (*Galba*) *truncatula* (Müller), loc. 9, 1 ex.

Bouillet, p. 71 (sub *Limnea minuta*); Germain, p. 501.

Ancylus fluviatilis (Müller), loc. 11, 17 ex.

Bouillet, p. 73; Germain, p. 548 (sub *Ancylastrum fluviatile*).

Common on stones in the shallow, rapidly running and very cold rivulet Couze.

Succinea (*Succinea*) *putris* (Linnaeus), loc. 13, 2 ex.

Bouillet, p. 44 (sub *Succinea amphibia*); Germain, p. 461.

The species lives on the swampy borders of the Lac Chauvet. Examined anatomically by Dr. C. O. van Regteren Altena.

Acanthinula (*Acanthinula*) *aculeata* (Müller), loc. 15, 3 ex.

Bouillet, p. 26 (sub *Helix aculeata*); Germain, p. 387.

Three young specimens collected in a sample of the soil.

Vallonia excentrica Sterki, loc. 8, 5 ex.

Germain, p. 383.

Vallonia pulchella (Müller), loc. 5, 1 ex.

Bouillet, p. 39 (sub *Helix pulchella*); Germain, p. 382.

Bouillet mentions *Vallonia pulchella* only, a species considered identical with *V. excentrica* by some malacologists. Since *V. excentrica* became known in 1893 only, it is impossible to decide which of the two species Bouillet actually dealt with in his catalogue. When Sterki described *Vallonia excentrica* he could mention two localities in France only, Germain (1930) records the same localities; Auvergne apparently is a new locality for the species.

Ena (*Ena*) *montana* (Draparnaud), loc. 18, 1 ex.

Germain, p. 370.

New to the fauna of Auvergne.

Ena (*Ena*) *obscura* (Müller), loc. 10, 1 ex.

Bouillet, p. 48 (sub *Bulimus obscurus*); Germain, p. 372.

Clausilia (*Clausilia*) *dubia* Draparnaud, loc. 4, 1 ex.; loc. 18, 2 ex.

Bouillet, p. 51; Germain, p. 358.

Clausilia (*Clausilia*) *bidentata* (Ström), loc. 1, 1 ex,; loc. 2, 3 ex.; loc. 4, 2 ex.; loc. 5, 10 ex.; loc. 9, 5 ex.; loc. 10, 35 ex.; loc. 14, 1 ex.; loc. 15, 2 ex.; loc. 18, 17 ex.

Bouillet, p. 52 (sub *Clausilia rugosa*?); Germain, p. 356 (sub *Clausilia nigricans*).

The present species is the commonest Clausiliid in Auvergne. The spec-

imens from loc. 2 were found crawling on waste shells of the Portuguese oyster *Crassostrea angulata* (Lam.).

Clausilia (*Clausilia*) *parvula* (Studer), loc. 10, 10 ex.

Bouillet, p. 52; Germain, p. 358.

In the same locality as *Clausilia bidentata,* but in separate populations.

Balea perversa (Linnaeus), loc. 10, 6 ex.

Germain, p. 346.

Not previously recorded from Auvergne.

Cochlodina laminata (Montagu), loc. 4, 2 ex.

Bouillet, p. 50 (sub *Clausilia bidens*); Germain, p. 338.

Discus rotundatus (Müller), loc. 1, 3 ex.; loc. 4, 6 ex.; loc. 5, 4 ex.; loc. 9, 4 ex.; loc. 14, 1 ex.; loc. 15, 12 ex.; loc. 16, 3 ex.

Bouillet, p. 41 (sub *Helix rotundata*); Germain, p. 167 (sub *Goniodiscus rotundatus*).

Vitrea crystallina (Müller), loc. 1, 1 ex.; loc. 9, 2 ex.; loc. 14, 5 ex.; loc. 15, 26 ex.; loc. 16, 2 ex.

Bouillet, p. 43 (sub *Helix crystallina*); Germain, p. 161.

Doubtlessly the present specimens belong to *Vitrea crystallina*; the umbilicus is rather narrow in some of my specimens.

Retinella (*Retinella*) *pura* (Alder), loc. 15, 21 ex.

Germain, p. 158.

The sample consists of young specimens; the largest shell has a diameter of 3.5 mm only. New to the fauna of Auvergne.

Retinella (*Perpolita*) *hammonis* (Ström), loc. 9, 1 ex.; loc. 14, 1 ex.

Germain, p. 157.

Not mentioned by Bouillet.

Oxychilus (*Oxychilus*) *cellarius* (Müller), loc. 8, 1 ex.

Germain, p. 147.

Not mentioned by Bouillet.

Vitrina (*Eucobresia*) *diaphana* Draparnaud, loc. 14, 2 ex.

Germain, p. 129 (sub *Phenacolimax diaphanus*).

Vitrina (*Phenacolimax*) *major* (Férussac), loc. 1, 1 ex.; loc. 14, 6 ex.; loc. 15, 1 ex.; loc. 16, 1 ex.

Germain, p. 133.

The specimen from loc. 1 was found in a mouldered stump of *Abies.*

Vitrina (*Semilimax*) *semilimax* (Férussac), loc. 15, 2 ex.

Bouillet, p. 22 (sub *Vitrina elongata*); Germain, p. 135 (sub *Vitrinopugio elongatus*).

Although I had at my disposal empty shells only, I could identify these by means of the monograph of Forcart (1944) and the material in the

Rijksmuseum van Natuurlijke Historie at Leiden. Bouillet does not cite *Vitrina diaphana* and *V. major*; he actually records *V. pellucida* (Müll.) and *V. subglobosa* Mich. (= *annularis* (Stud.)). The occurrence of *V. pellucida* can be expected in Auvergne because it is known from the surrounding area and suitable biotopes are present. However, there arises some doubt if we consider that in the here discussed collection *V. major* is the commonest Vitrinid; it is possible that Bouillet made the mistake to identify his specimens of *V. major* with *V. pellucida*. It is rather difficult to separate young specimens of the two species.

The occurrence of *V. annularis* in Auvergne is highly improbable. The species is known in W. and Central W. Europe from localities in the Pyrenees and the Alps; moreover, this snail has a definite preference for high altitudes (vide, e.g., Forcart, 1956).

It is interesting to note that *V. diaphana* and *V. major* were collected at the same locality, for generally the two species prefer quite different biotopes.

Arion (*Arion*) *lusitanicus* Mabille, loc. 16, 3 ex.

Bouillet, p. 11, p. 12 (sub *Arion empiricorum* or *A. ater*?).

The discovery of *Arion lusitanicus* in Auvergne doubtless is the most important result of the excursion. Recently Van Regteren Altena, Aten & Schouten (1956) [1]) published a paper on the occurrence of the species in France. They enumerate localities in the départements Haute-Garonne and Pyrénées-Orientales, and finish their publication by assuming that this slug might be found in the French Pyrenees from the Mediterranean up to Bagnères-de-Luchon (Haute-Garonne). The finding of the present specimens, collected about 300 km N. of the northernmost known locality in France, greatly extends the known area of dispersal, which up to now comprises the following regions (generally one locality or a few only are concerned): the Azores, Madeira, Portugal, eastern Pyrenees, Menton, and Auvergne in France, S.W. Ireland, and N.E. England. Moreover, it is likely that in due time specimens will be collected in the intermediate regions (especially in France). One has to note that the locality in England can be considered secondary (cf. Quick, 1952).

The three animals from Auvergne have the following measurements (in alcohol 70 %): length 6.3, 6.5, and 6.8 cm. The colour is uniformly black with a pale grey sole. The sole is divided into three longitudinal areas; the division gradually becomes more evident backward, where the lateral

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1) The number of the periodical is dated December, 20, 1955, the reprints bear the date 1956 only.

areas grow somewhat darker. The genital organs agree fairly well with those figured by Van Regteren Altena, Aten & Schouten (loc. cit., fig. 3a); in two specimens the distal part of the penis shows a greyish colour, in the third this part is completely colourless. The taxonomic value of this character still has to be considered doubtful (cf. Van Regteren Altena, Aten & Schouten, loc. cit., p. 96).

Presuming that I took specimens of *Arion rufus* (L.), I unfortunately collected three of these slugs only. Similar animals were fairly common in various parts of Auvergne; it is, however, possible that the two species occur together in one habitat, just as in the Pyrenees. Therefore it is difficult if not impossible to ascertain which species was recorded by Bouillet.

Arion (*Arion*) *subfuscus* (Draparnaud), loc. 3, 1 ex.; loc. 14, 2 ex.

Bouillet, p. 12; Germain, p. 75.

It is a well-known fact that the present species occasionally reaches high altitudes in the mountains. The specimen from the Puy Ferrand (1846 m, loc. 3) is rather large but not yet ripe, the two other slugs are large and ripe, and juvenile, respectively.

Lehmannia (*Lehmannia*) *marginata* (Müller), loc. 3, 1 ex.; loc. 9, 1 ex.; loc. 12, 2 ex.; loc. 14, 2 ex.; loc. 16, 1 ex.; loc. 18, 4 ex.

Bouillet, p. 18 (sub *Limax salicium*); Germain, p. 88.

Syn. *Limax arborum* Bouch.-Chant.

Lehmannia marginata is one of the commonest slugs in Auvergne. Adult and juvenile specimens were found together in nearly every sample; the shape of the flagellum or appendix of the penis shows a small amount of variation. The present collection contains a ripe uniformly black slug from an altitude of 1846 m (loc. 3), which has somewhat paler black sides and a pale grey sole. The animal agrees fairly well with the description of the var. *rupicola* Less. & Poll. (cf. Taylor, 1907, p. 96). This form, of which the taxonomic status is very doubtful, is extremely rare in France, if not new to this country. Other specimens, especially young ones, have a very dark and strongly marked colour pattern (loc. 14), while a very small specimen shows a dark greyish brown background (loc. 16).

Deroceras reticulatus (Müller), loc. 10, 4 ex.; loc. 16, 1 ex.

Bouillet, p. 17 (sub *Limax agrestis*?); Germain, p. 103.

Euconulus fulvus (Müller), loc. 14, 1 ex.; loc. 15, 1 ex.; loc. 16, 1 ex.

Bouillet, p. 25 (sub *Helix fulva*); Germain, p. 139.

Helicella (*Candidula*) *candidula* (Studer), loc. 17, 115 ex.

Bouillet, p. 36 (sub *Helix candidula*); Germain, p. 272 (sub *Helicella unifasciata*).

The species was found in great numbers in a hay-field on a slope exposed

to the S. The material consists for the greater part of not yet adult and juvenile specimens; the largest shell measures 5.8 × 3.9 mm.

Hygromia limbata (Draparnaud), loc. 1, 32 ex.; loc. 4, 3 ex.; loc. 6, 2 ex.; loc. 8, 1 ex.; loc. 9, 1 ex.; loc. 10, 2 ex.; loc. 14, 2 ex.; loc. 16, 3 ex.; loc. 17, 1 ex.

Bouillet, p. 33 (sub *Helix limbata*); Germain, p. 259.

The species inhabits Central and S.W. France and occurs commonly everywhere in Auvergne. The ground colour varies from greyish yellow to pale reddish brown. The narrow opaque white peripheral band is sometimes absent, a phenomenon found only in shells with a very pale background. The specimens from loc. 1, mainly juvenile, were collected on *Petasites officinalis* Mnch.

Trichia (*Trichia*) *hispida* (Linnaeus), loc. 1, 3 ex.; loc. 5, 11 ex.

Bouillet, p. 34 (sub *Helix hispida*); Germain, p. 240 (sub *Fruticicola hispida*).

Some shells have a faint whitish band behind the aperture along the periphery of the last whorl. The specimens from loc. 1 were collected on *Petasites officinalis* Mnch.

Euomphalia strigella (Draparnaud), loc. 18, 2 ex.

Bouillet, p. 27 (sub *Helix strigella*); Germain, p. 255.

Helicigona (*Helicigona*) *lapicida* (Linnaeus), loc. 10, 18 ex., loc. 18, 11 ex.

Bouillet, p. 38 (sub *Helix lapicida*); Germain, p. 223.

Helicigona (*Arianta*) *arbustorum* (Linnaeus), loc. 1, 10 ex.; loc. 4, 1 ex.; loc. 17, 8 ex.

Bouillet, p. 29 (sub *Helix arbustorum*); Germain, p. 226 (sub *Arianta arbustorum*).

The specimens from loc. 17 were collected on *Petasites officinalis* Mnch.

Cepaea hortensis (Müller), loc. 1, 15 ex.; loc. 5, 3 ex.; loc. 7, 1 ex.; loc. 10, 10 ex.; loc. 16, 1 ex.; loc. 18, 9 ex.

Bouillet, p. 32 (sub *Helix hortensis*); Germain, p. 194.

The specimens from loc. 1 were collected on *Petasites officinalis* Mnch. One specimen is exceptionally small, viz., 15 × 11 mm, though it has a well developed peristome. It is remarkable that *Cepaea nemoralis* (L.) does not occur in the present collection; Bouillet, however, enumerates the species. A similar instance was observed by the author in a collection from the Vosges, France (cf. Van Bruggen, 1953).

Helix aspersa Müller, loc. 10, 3 ex.

Bouillet, p. 30; Germain, p. 185.

Helix pomatia Linnaeus, loc. 18, 1 ex.
Bouillet, p. 28; Germain, p. 183.
The present specimen shows remnants of three horizontal dark brown bands on a pale background.

Lamellibranchia

Pisidium nitidum Jenyns, loc. 13, 18 ex.
Germain, p. 706.
Pisidium hibernicum Westerlund, loc. 13, 7 ex.
Germain, p. 704.
Pisidium lilljeborgii Clessin, loc. 13, 3 ex.
Germain, p. 707.

Bouillet enumerates on pp. 85-86 the following Sphaeriidae: *Cyclas rivalis* (= *Sphaerium corneum* (L.)), *C. lacustris* (= *Sphaerium lacustre* (Müll.)), and *C. fontinalis* (= probably *Pisidium casertanum* (Poli)). The occurrence of *Pisidium nitidum* in Auvergne was to be expected; Germain, however, did not know any locality of *P. hibernicum* and *P. lilljeborgii* in recent state in France. Favre (1940) was the first to record the two species from a French locality, though *P. lilljeborgii* from fossil deposits only.

The discovery of *P. lilljeborgii* is interesting for two reasons, viz., the Lac Chauvet constitutes the westernmost locality for this Sphaeriid on the European continent (according to Kuiper, in litt.), and, although generally it lives sublitoral in rather deep water at a depth of 2 to 15 m, it was found alive on the shallow and swampy shores of the lake at a depth of about 5 to 10 cm. The Lac Chauvet, as most of the lakes in Auvergne, is an ancient crater of a volcano; this lake attains a depth of 63 m in the middle (fide Olivier, 1954). The small number of specimens collected shows that probably we are dealing with stray specimens.

I am much obliged to Mr. J. G. J. Kuiper in Paris for the identification of the species of *Pisidium*.

The present collection comprises 45 species of which 14 (31 %) were not mentioned by Bouillet, viz., *Acme dupuyi, Carychium tridentatum, Vallonia excentrica, Ena montana, Balea perversa, Retinella pura, R. hammonis, Oxychilus cellarius, Vitrina diaphana, V. major, Arion lusitanicus, Pisidium nitidum, P. hibernicum,* and *P. lilljeborgii.* The occurrence of three of these species in France was unknown to Germain or was regarded doubtful by this malacologist, viz., *Arion lusitanicus, Pisidium hibernicum,* and *P. lilljeborgii.*

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RÉSUMÉ

En août 1955 le Dr. H. C. Blöte, M. J. J. Barkman et l'auteur, accompagnés par un groupe d'étudiants de l'Université à Leyde, ont fait une excursion biologique dans le département du Puy de Dôme, en Auvergne, excursion au cours de laquelle l'auteur a fait des recherches sur les mollusques terrestres et fluviatiles de cette région. Le résultat en est publié ci-dessus; la fig. 1 indique les localités mentionnées dans la texte.

On ne connaît comme livre important sur les mollusques d'Auvergne que l'ouvrage, déjà ancien, de Bouillet (1836), ce qui explique qu'un malacologiste étranger ait pu maintenant faire quelques découvertes intéressantes.

La collection conservée au Musée National d'Histoire Naturelle à Leyde compte 45 espèces dont 14 non mentionnées par Bouillet dans son catalogue: *Acme dupuyi, Carychium tridentatum, Vallonia excentrica, Ena montana, Balea perversa, Retinella pura, R. hammonis, Oxychilus cellarius, Vitrina diaphana, V. major, Arion lusitanicus, Pisidium nitidum, P. hibernicum* et *P. lilljeborgii*. Germain (1930-1931) ne connaît pas localités françaises de *Pisidium hibernicum* et *P. lilljeborgii*; Favre (1940) a trouvé ces deux espèces au Lac du Bourget, *P. hibernicum* "en voie de disparaître" (p. 343) et *P. lilljeborgii* fossile "dans la craie lacustre de la baie d'Hautecombe" (p. 346). *Arion lusitanicus* n'est pas mentionné par Germain. Sur cette limace un rapport inté-

ressant fut récemment publié par Van Regteren Altena, Aten & Schouten (1956); ces malacologistes hollandais n'ont signalé que des localités dans les départements des Pyrénées Orientales et Haute-Garonne. Trois exemplaires d'*Arion lusitanicus* furent récoltés dans une forêt de hêtres S.S.E. de Besse-en-Chandesse (loc. 16); l'anatomie de l'appareil génital de ces limaces correspond très bien aux figures de Van Regteren Altena, Aten & Schouten. Actuellement la dispersion connue de ce grand *Arion* est comme suit: les Açores, Madeire, Portugal (quelques localités), France (Pyrénées, Menton, Auvergne), S.W.-Irlande et N.E.-Angleterre. Or, la localité nouvelle en Auvergne convient assez bien à la dispersion déjà connue.

A la loc. 3 (1846 m) on a trouvé un animal noir de *Lehmannia marginata,* correspondant à la description de la var. *rupicola* Less. & Poll., une forme très rare ou inconnue en France.

Selon une communication de M. J. G. J. Kuiper (in litt.) le Lac Chauvet (loc. 13) constitue la localité la plus occidentale de *Pisidium lilljeborgii* au continent d'Europe; on a recueilli des coquilles de ce petit bivalve, une espèce des eaux assez profondes (profondeur de 2 à 15 m), contenant des animaux vivants, sur les bords marécageux du Lac Chauvet. Cet ancien cratère volcanique atteint une profondeur de 63 m.