PSYCHE

A REVIEW OF THE NORTH AMERICAN SPECIES OF NOTIOPHILUS.

BY H. C. FALL, PASADENA, CAL.

Mr. Hayward's recent article (Psyche, Oct., 1905) on the secondary sexual characters of Notiophilus, recalls a short study of this genus made by the writer some seven or eight years ago, which, having progressed to the point of preparing a preliminary table of species, was dropped for other work. Since the publication of Mr. Hayward's note, the old data have been resurrected, some further investigation made, and the results are offered as of possible interest to students of our Coleoptera.

In completing the present review I have been very greatly aided by Mr. Frederick Blanchard, who has not only made a most thorough study of the Le Conte Collection, fixing the status of the earlier types of this author, but also an examination of the collections of Melsheimer, Harris and Ziegler, where were found undoubtedly authentic exponents of Say's *semistriatus*, a species which Le Conte himself failed to properly interpret. The results of Mr. Blanchard's observations are embodied in the synonymy which follows, and to him belongs almost the entire credit for this very considerable portion of the work. While no effort has been made to obtain material from many sources, special series have been sent by Messrs. Leng, Wickham, Knaus and Blaisdell, to all of whom my sincere thanks are due.

The genus Notiophilus is widely dispersed throughout the North Temperate Zone and occurs in almost every portion of our territory, though evincing a somewhat marked preference for hilly and mountainous regions. Although of small size, the peculiar and pleasing form and sculpture of these insects has made them favorites with collectors, yet it is a fact that aside from *aeneus, semiopacus* and perhaps *sylvaticus,*—all strongly marked forms— our native Notiophili are sure to be found more or less confused in nearly all collections.

At the time of my original investigation it was noted that in all species of the genus the males have one setigerous puncture each side and the females two;* but I do not recall having observed the dilation of the middle tarsi in the males of certain species to which Mr. Hayward alludes, and which was originally announced by C. G. Thomson.† This modification is at best very feeble, and in view of its gradational character, quite too slight to be used for specific separation. To illustrate: Hayward divides our species into two groups, the first containing *sylvaticus, aquaticus, hardyi* (=*aquaticus*) and *nitens,* in all of which the basal joint of the middle tarsi is dilated; the second containing *aeneus, semiopacus, semistriatus* (=*novemstriatus*) and sibiricus (*semistriatus*) ‡ having this joint "simple as in the females." This division is quite correct, and when we compare the opposite extremes—*sylvaticus* and *aeneus*—the difference is very obvious, but if we compare the adjacent extremes of the two series—say *nitens* and *novemstriatus*—the difference is so slight that a trifling individual variation might easily reverse their positions. Wherever there is any dilation of the basal joint of the middle tarsus, there is a similar and better marked modification of the front tarsus; in fact, with the possible exception of *aeneus*, where it is scarcely detectable, the males of all species have the first three joints a little dilated or more triangular in form than in the female, the difference being relatively slight in the species of Hayward's second group. In all species of the genus, without exception, the first three joints of the front tarsi are more or less squamose beneath in the male, as is also the basal, and sometimes the second joint of the middle tarsi; the squamules here being present in the apical half or less of the joints in those species with the first joint undilated. In the reference above quoted, Thomson describes as new *bigeminus,* and states that it differs from the common European species—*aquaticus, palustris* and *biguttatus*—in its simple non-spongiose middle tarsi of the male, and in the securiform last joint of the labial palpi, especially in the male. The entire correctness of Thomson's statement may, I think, fairly be questioned, as I much doubt if there is any species of Notiophilus in which the middle tarsi are normally absolutely

*This character fails in rare instances. I have seen a male *semistriatus* with two anal punctures, and a female of *aquaticus* with only one puncture each side.

† Bull. Ent. Soc. France, 1883, p. CXII.

‡ *Obscurus* Fall was omitted by Mr. Hayward, being unknown to him; it is virtually the same as *nitens* in this respect. The parentheses are mine.

devoid of squamules. Mr. Blanchard has recently observed (*in litt*) that the palpi are more or less dilated in the males of certain of our species. An examination shows that this is true of all our species, the dilation being as a rule slight, but in *semistriatus* quite strongly marked, and sufficient to at once separate this species from all others in our fauna.

Of the not very numerous characters useful in distinguishing our species, it may be well to briefly discuss two or three of the more important before using them in the following table. In all of the species the front is broadly longitudinally grooved at the sides, the intervening space being marked with narrower grooves or striae which differ in number and fineness in such a fashion as to enable us to divide our species into three groups. The striae are not infrequently more or less irregular, so that the exact number is not always easy to determine, but with a very little experience there is rarely any difficulty in determining to which group a given specimen belongs.

These three sections may be termed from the number of frontal striae the 5-striate, 7-striate, and 12-striate groups. Of these the 5-striate series is much the most numerous, containing eight of the eleven North American forms, including all that are found east of the Mississippi River, or for that matter east of the Rocky Mountains, if we except a form of *nitens* occurring in Texas. To the second group belong *nitens* and *obscurus*, two closely allied species, which are intermediate between the first and third groups in other characters besides the number of frontal striae. To the 12-striate group belongs only *semiopacus*. The striae here are very fine and seem to vary in number from eleven to thirteen.

Another character which I have found to be remarkably constant is the number of annulate setigerous punctures ("foveae") near the apex of the elytra. This character is an especially useful one, inasmuch as it permits of separating at once and with certainty, forms which are without careful attention easily confused. In all the species there is a setigerous puncture near the apex and just within the deeply impressed apical portion of the seventh stria. In the greater number of species there is also a second puncture immediately in front of this, and distant from it as a rule somewhat less than its distance from the suture, but in three species—*semistriatus, aquaticus* and *borealis*—the apical puncture alone is present. The other characters used in the following table are sufficiently clear or will be made so in the remarks under the various species.

In several instances our species are mutually very closely related, depend

ing for their specific standing on an assemblage of minor characters which, while probably quite sufficient for their establishment, render their tabulation somewhat unsatisfactory because of their gradational nature. Absolute characters are present only in the two extremes of our series—*aeneus* and *semiopacus*.

TABLE OF SPECIES.

Front 5-striate between the broad lateral grooves.

Legs and antennae entirely pale; head much wider than the prothorax, the sides of the latter deeply sinuate posteriorly.....1 *aeneus*.

(Legs dark or with the tibiae alone paler, antennae pale at base only.)

Elytra each with one apical annulate puncture.

Form generally stouter, sides of prothorax more strongly sinuate behind; elytral striae complete, the inner ones, however, faintly impressed at apex; tibiae more or less pale; last two joints of maxillary and terminal joint of labial palpi dark, the latter quite broadly dilated and truncate in the male.....2 *semistriatus*.

Form less stout, sides of prothorax less sinuate behind, inner elytral striae nearly or quite effaced at apex; palpi dark except at extreme base, the terminal joint of the labial palpi but slightly modified in the male.

Less elongate, prothorax more transverse, elytra parallel, more strongly punctured and less bronzed, tibiae usually dark, sometimes pale.....3 *aquaticus*.

More elongate, prothorax less transverse, elytra a little narrowed anteriorly; less strongly punctured and more bronzed; tibiae always dark.....4 *borealis*.

Elytra each with two apical annulate punctures.

Elytra usually entirely black bronzed, rarely with pale apical stripe.

Second discal stria of the elytra more remote from the fifth than from the sutural stria, striae becoming rapidly obsolete behind the middle; tibiae dark.....5 *simulator*.

Second discal stria of the elytra less remote from the fifth than from the sutural stria; striae less fine and in part entire; tibiae paler.....6 *novemstriatus*.

Elytra with a broad and entire yellow lateral vitta occupying the lateral interstriae.

Form more elongate, prothorax less transverse and more narrowed

behind. ..... 7 *nemoralis.*
Form less elongate, prothorax more transverse, sides straighter and less convergent behind. ..... 8 *sylvaticus.*

Front 7-striate.

Prothorax rather strongly narrowed posteriorly, interstriae of elytra feebly or scarcely alutaceous, a single dorsal puncture. ..... 9 *obscurus.*
Prothorax less narrowed posteriorly, interstriae of elytra distinctly alutaceous, dorsal punctures usually two in number. ..... 10 *nitens.*

Front about 12-striate; lateral interstriae and sutural interspace opaque, dorsal punctures usually three, rarely two or four. ..... 11 *semiopacus.*

1. *N. aeneus* Hbst.

Very distinct from all our remaining species and at once recognizable by the pale legs and antennae. It represents an extreme among our species in its larger head, stouter antennae, deeply sinuate sides, prominent hind angles and broadly impunctate disk of the prothorax, and in the less unequal elytral interspaces, thereby approaching the usual type of striation in the Carabidae. The labrum is here distinctly emarginate at apex, but scarcely at all so in our other species. The dilation of the male tarsi is at a minimum, being scarcely detectable, and the squamules of the middle tarsi are few in number.

Aeneus is a common species in the Northern States and Canada from New England to Lake Superior and Illinois, and extends as far south as North Carolina. (Blanchard).

2. *N. semistriatus* Say.

In its rather strongly narrowed and sinuate sides of the prothorax, and the relatively narrow second elytral interspace, this species approaches *aeneus* more closely than does any other, and forms a natural transition to those which follow. It is, as a rule, a little more robust than *aeneus*, and differs from it and all other species of the 5-striate group except *sylvaticus* and *nemoralis* in its more distinctly impressed and more complete elytral striae, which though fine are all quite evident at apex. In color it is black, moderately bronzed, surface polished throughout, basal four joints of antennae, and tibiae in great part, pale. Terminal joint of palpi (especially the labial) quite strongly dilated and truncate. I have seen several examples in which the discal annulate puncture of the elytra is wanting, a condition not yet observed in any other species.

Semistriatus is widely dispersed, occurring from New England to New Mexico The following localities are known to me: Massachusetts; Staten Island, New York (Leng.); Pennsylvania; New Jersey; North Carolina; Ohio; Illinois; Iowa; Ottawa; Canada; Manitoba; Kansas; Veta Pass, Colorado (Schwarz); Breckinridge, Col., 9600-10,000 feet (Wickham); New Mexico (Snow); Cloudcroft, New Mexico (Knaus.)

The species here regarded as *semistriatus* agrees well in size and general character with Say's description, and is the one so understood by Harris, Melsheimer and Ziegler. Moreover it is the only species with which Say could have confused his *porrectus* (*aeneus* Hbst.), which he originally described as "var B" of *semistriatus*. The *semistriatus* of Le Conte and Crotch was Le Conte's *novemstriatus*, a much smaller and very different looking species which is common in the eastern United States. The true *semistriatus* was described as *confusus* by Le Conte, who afterward wrongly placed it as a synonym of the East Siberian *sibiricus*, with which he also confused his own *punctatus*.

3. *N. aquaticus* Linn.

Very similar to *semistriatus*, and as a rule a little smaller and less robust, though frequently not at all so. The prothorax is a little less narrowed behind, the sides less strongly sinuate, the elytral striae less impressed and less coarsely punctured than in *semistriatus*; the discal striae are moreover almost completely effaced at apex, while they are more or less distinctly traceable in *semistriatus*. The tibiae are entirely dark in the great majority of specimens but are occasionally more or less pale, and the elytra have rarely a more or less distinct pale apical vitta. The terminal joints of palpi are perhaps a little more evidently dilated in the male than usual, but the dilation never approaches in degree that exhibited by males of *semistriatus*. *Aquaticus* is also nearly related to *borealis* and *simulator*, the former separable however by its more elongate form, and the latter by the two apical annulate apical punctures of the elytra. Further differences will be given under these species.

After a very careful study of available material and of the literature of the subject, there seems to be no other course than to unite *punctatus* Lec. and *hardyi* Putz. with *aquaticus* Linn., which occurs commonly throughout Europe and Northern Asia. The *punctatus* of Le Conte was described from Lake Superior. In the types, and also in a series from Hudson's Bay Territory in the Le Conte collection, the tibiae are reddish and the elytra have a pale apical vitta, but on comparison with a typical Newfoundland specimen of

hardyi, sent to Le-Conte by Putzeys, Mr. Blanchard assures me that he has not the slightest doubt of their identity. This most obvious variation in the specimens in our fauna, viz—the color of the tibiae and elytral apex, are noted by Putzeys in his description of *hardyi*, and are exactly paralleled in European specimens of *aquaticus*; in fact the described variations of *aquaticus* in Europe are much greater than that existing between a series sent me by Reitter, and our native specimens.

Kirby many years ago recorded *aquaticus* from British America, and Sahlberg has more recently thus identified a specimen from the Alaskan coast of Behring Strait. Le Conte pronounced Kirby's reference erroneous, but there is ample reason for saying that the correctness of Le Conte's views in this genus is not above suspicion. The introduction of *aquaticus* into the supplement of the Henshaw list is based on Sahlberg's record, which may have been correct, though I suspect that the species in question was really *borealis*, a species which is closely related to *aquaticus*, and which is known to me from Alaska.

In our fauna *aquaticus* is known to range from Labrador through northern New England and Canada to Lake Superior, Hudson Bay, Manitoba, Montana, and in the higher parts of the Rocky mountains as far south as New Mexico. It is thus seen to be a distinctly more northern species than *semistriatus*, which occupies the intervening territory to the south. Its occurrence at Tyngsboro in northeastern Massachusetts and only a few hundred feet above sea level is quite exceptional according to Mr. Blanchard, who says—"In February, 1870, about fifty specimens of *N. aquaticus* were picked up from a frozen temporary pool in a grassy field; some were partly frozen into the ice, others were crawling about on the surface. Of these I have only three ♀'s left, all others having been distributed as *hardyi*, and none have since been taken here."

The following specific localities are known to me: Labrador (Strait of Belle Isle—Sherman); Newfoundland (*hardyi* in Le-Conte Coll., Bay of Islands—Leng.); New Hampshire (Mt. Washington and Pack Monadnock—Blanchard); Massachusetts (Tyngsboro and summit of Mt. Watatic—Blanchard); Wisconsin (Bayfield—Wickham); Lake Superior and Hudson Bay Territory (Le Conte Coll.); Montana (Kalispell—Wickham and the writer); Colorado (Argentine Pass and Veta Pass—Schwarz, Mountains southwest of Montrose, 9-10,000 feet, Cochelopa Pass, Durango 5500-7000 feet—Hayward); New Mexico (Beulah—8,000 feet, Las Vegas Range 11,000 feet Cockerell).

4. *N. borealis* Harris.

Very closely allied to the preceding species, the chief differences being as follows: The color is more brightly bronzed than in our native specimens of *aquaticus*, the general form more elongate, the prothorax distinctly less transverse and slightly more narrowed posteriorly, the elytra more elongate and more oval, widest behind the middle, narrowing a little anteriorly, the humeri in consequence less strongly rounded; elytral striae a little more finely punctate and as a rule less completely effaced at apex. The tibiae are apparently always dark; the basal joint of the antennae, except very rarely, is entirely dark; joints 2-4 pale beneath, usually dark above, but sometimes only slightly so. In *aquaticus* the first four joints are pale beneath.

This species is the most truly boreal or alpine in distribution of any in our fauna. It has been taken by Mr. Blanchard on or near the treeless summits of Mts. Washington and Lafayette in the White Mountains of New Hampshire, and by Mr. Leng on Mt. Marcy, the highest peak of the Adirondacks, the beetles being obtained, writes Mr. Leng, "by sifting the mosses that flourish in sheltered places among the otherwise bare rocks of the summit." Specimens closely in accord with these have been sent me by Dr. Blaisdell, who took them at Nome, Alaska. I have, under *aquaticus*, expressed the suspicion that the Alaskan specimens recorded by Sahlberg as *aquaticus* were really the present species.

The name *borealis* is adopted from the Harris Correspondence, published by Scudder in 1869. It was used by Dr. Harris in a letter to Dr. LeConte (Jan. 23, 1849) for a specimen taken in the White Mountains by Mr. Tuckerman. Mr. Blanchard writes that "this species is at present represented in the Harris collection by a single female specimen without name, numbered 1680, and referred to by number only in the Ms. catalogue as having been collected by Mr. Tuckerman at the White Mountains in 1838. The specimen now bears the label *hardyi*," which has of course, been attached comparatively recently. There can be no doubt whatever that this specimen is the true *borealis* of the "Correspondence," and though the brief allusions therein do not fairly constitute a description, still, as no subsequent description has been written and no synonymy is involved, I have chosen to quote Harris as the author of the species.

5. *N. simulator*, n. sp.

This species greatly resembles *aquaticus* but is always separable by the two apical annulate punctures. In addition, the size is a little smaller, the elytral striae decidedly finer, becoming effaced at a greater distance from the apex, the

dorsal puncture a little more basal in position; the sides of the prothorax a little straighter and very feebly sinuate posteriorly. The palpi and antennae are colored as in *aquaticus;* the tibiae are black in all specimens seen.

Length 4.4—4.65 mm.

Four specimens, all ♀ 's, have been sent by Mr. Wickham. They bear labels as follows: Mullan, Montana; Leavenworth Valley and Silver Plume, 9000-11000 feet, Colorado; Houston, Texas. There is a specimen, also a ♀ , in Dr. Blaisdell's collection from Coeur d'Alene, Idaho, probably also collected by Wickham.

Simulator is the nearest approach in our fauna to the Siberian *sibiricus* of which there is a specimen in the LeConte collection labeled "Ajan," and sent by Motschulsky himself. This specimen, writes Mr. Blanchard, "is a little larger than *simulator*, prothorax a little more narrowed at base and sinuate each side behind, the elytra with humeri more arcuate each side to meet the narrowed prothorax, elytral striae more produced behind and more coarsely punctate except at base, the elytra apparently a little more elongate." These differences, it will be seen, are precisely those which separate *simulator* from *aquaticus*, and were it not for the two apical punctures in *sibiricus* it could not possibly be separated from *aquaticus*.

6. *N. novemstriatus* Lec.

Our smallest species, and withal the commonest in the eastern United States. It is easily recognized by its small size, rather strongly bronzed surface lustre, very broad second elytral interspace and consequent crowding of the lateral striae, and two apical annulate punctures. The inner ones of the lateral striae are more or less completely obliterated before the apex, the apical portion of the first of these (the second stria) however, remaining as a short isolated furrow. Two or three of the striae before the deeply impressed seventh are always nearly or quite entire. The four basal joints of the antennae, and the tibiae, are always pale, the palpi dark except at base. There is occasionally a pale apical elytral vitta, more often seen in specimens from the Southern States. In all the preceding species the surface of the elytra is polished throughout, there being only the faintest indication of alutaceous sculpture at the extreme apex. In the present species the apex is always distinctly alutaceous for a short distance, and this sculpture exists in all the following species, becoming strongly marked in the 7-striate and 12-striate groups.

Specimens of this species with the front normally striate were early referred by LeConte to *semistriatus* Say, while others of the same species (and afterwards so recognized by LeConte) in which the frontal striae were broken up or divided as they frequently are in some degree, served as the types of *novemstriatus*. The name is thus seen to be an unfortunate one, but must stand. Harris observed that in this species the dorsal and apical punctures are placed in shallow foveae and therefore gave it the name *quadrifovcatus* in MS. These foveae are, however, often feeble or obsolete and Harris' name would therefore be but little better than LeConte's.

Novemstriatus inhabits most portions of our territory from northern New England to Florida, and westward to New Mexico. The following localities are known to me: New Hampshire, Massachusetts, Rhode Island, New York, Pennsylvania, New Jersey, District of Columbia, Maryland, Virginia, North Carolina, South Carolina, Ohio, Iowa, Florida (Pensacola), Alabama (Mobile), Lousiana (Vowell's Mills—Leng.), Nebraska, Kansas, Texas, New Mexico (Cloudcroft, Viereck).

7. *N. nemoralis* n. sp.

This and the following species differ conspicuously from all others of the 5-striate group by the entire or subentire broad lateral yellow stripe of the elytra. Both forms have hitherto passed as *sylvaticus,* but the present one, which is known to me only from Northern New England is quite readily separable from the true *sylvaticus* of the North Pacific coast fauna by the somewhat larger head, slightly less transverse prothorax, which is distinctly more narrowed behind and more coarsely punctate beneath, and by the slightly longer more oval elytra, which are almost always a little more deeply striate. It may be seen at once that this species bears the same relation to *sylvaticus* that *borealis* does to *acquaticus*. It is of course quite possible that *nemoralis* and *sylvaticus* are merely geographical races of one species, but the fact that no intermediate form, nor even a specimen of either has ever been recorded from the three thousand miles of intervening territory makes it probable that they are now completely isolated and distinct, whatever their origin. *Nemoralis* is in fact more nearly related to the European *biguttatus* than to *sylvaticus,* and I was once tempted to consider them identical. A careful comparison shows that biguttatus is a somewhat stouter insect, the prothorax a trifle more transverse and the elytra less elongate, with the second or broad interspace a little wider. According to Putzey's description—the only one at hand—the yellow apical

spot frequently reaches the middle of the elytra, but no mention is made of its ever reaching the base, nor does it do so in any of the specimens seen by me.

Nemoralis is more restricted in habitat than any other species known to me, and the greater number of specimens seen are labeled "White Mts., N. H." Other localities—none of them very far from the White Mountains— are Moosilauke, N. H., and Rangely, Me. (Blanchard), and Camels Hump, Vt. (Sprague). Specimens were obtained, writes Mr. Blanchard, by "sifting moss, etc. in the upper woods (White Mts.), and the Rangely specimen occurred several hundred feet above the lakes * * * also sifting in woods."

8. *N. sylvaticus* Esch.

The differential characters between this and the preceding species have already been set forth, and there can scarcely be any excuse for confusing it with any other. Some examples of *semiopacus* show a complete lateral vitta, which is, however, of a paler, duller yellow and quite opaque, not to mention the differently striate front and numerous dorsal punctures by which the latter may always be readily separated.

This species occurs rather commonly in the Coast belt from southern Mendocino County, in California, through Oregon, Washington, Vancouver and British Columbia to Sitka and Kenai in Alaska. It occurs at both low and high altitudes, at least toward the southern portion of its range, having been taken by Dr Van Dyke "high up on Mt. Rainer, much above 5000 ft., equivalent to an altitude of 8000 or 9000 feet in the southern Sierras."

9. *N. obscurus* Fall.

As indicated in the synoptic table, the present species and *nitens* may be distinguished from our other species by the front having seven striae between the broad lateral grooves. In my original description of *obscurus* the front was described as 8-10 striate, the lateral grooves in this case being counted. In addition to the number of the frontal striae, these two species occupy an intermediate position between the 5-striate and 12-striate groups in several other particulars. In *sylvaticus* a tendency becomes manifest toward a reduction of the punctuation of the under surface of the prothorax. In *obscurus* this is much more marked, the episterna becoming in most specimens very sparsely punctate or almost smooth, a condition which is the rule in *nitens* and *semiopacus*. In *obscurus* the sides of the prothorax are rather sharply rounded

or subangulate a short distance behind the apex, thence quite strongly convergent and but feebly sinuate before the hind angles. In *nitens* and *semiopacus* the sides are normally subangulate in front, less convergent and still straighter posteriorly. In *obscurus* there is but one discal puncture except in very rare instances, an extra puncture being present on one side only in two examples of a series of forty specimens. In *nitens* the majority of specimens have two discal punctures, one of which is frequently lost on one or both sides; while in *semiopacus* there are normally three or four punctures, very rarely only two. Although quite variable in size, *obscurus* is on the whole our largest and broadest species (4 1-2 - 6 mm). In color it is rather strongly bronzed, the base of the antennae and tibiae paler. The lateral interstriae are at most slightly alutaceous, often scarcely visibly so except at apex, which is usually obscurely yellowish, the pale shade sometimes extending well forward, becoming gradually evanescent.

Obscurus is known to me only from the Sierras of California, ranging from Shasta (Blaisdell) to San Bernardino, occurring only near the summit of the mountains in the south, but at lower levels toward the north.

10. *N. nitens* Lec.

Closely allied to *obscurus*, but smaller, with relatively smaller head and with the sides of the prothorax straighter and less convergent behind. The elytral striae are as a rule scarcely impressed and more finely punctured, and the lateral intervals are always distinctly alutaceous. In the type there is but a single discal puncture, but the normal number (if there can really be said to be one) seems to be two. In the seven examples at hand, four have two punctures, two have two punctures on one elytron and one on the other, while one has the disk of each unipunctate. In the type there is a yellow spot or vitta in the apical fourth; this is more or less evident in most specimens, but may be entirely absent.

The type and only specimen known to Le Conte was taken by Dr. Cooper at Prairie Paso, Oregon. The species seems not to have since been recognized by collectors, but I am quite confident that specimens taken at Dalles, Oregon and Coeur d' Alene, Idaho, by Mr. Wickham, are the same species. With these I have also placed a Waco, Texas specimen sent by Mr. Knaus, and a perfectly similar one, also from Texas, but without exact locality, belonging to the Cambridge Museum collection These are a little smaller than the northern

examples, but scarcely differ otherwise; in each the elytra have two discal punctures.

11. *N. semiopacus* Esch.

The finely very numerously striate front and opaque sutural and lateral intervals of the elytra make the recognition of this species at once easy and certain. The head is barely as wide as the prothorax, the latter less narrowed behind than usual, the sides subangulate in front and nearly straight posteriorly; elytral striae fine, dorsal punctures usually three, rarely two or four, frequently with a dull luteous lateral vitta, which may be entire, or distinct only toward the apex.

Occurs in Oregon and California, all specimens but one known to me being from the latter state. The following Californian localities are represented: San Diego, Poway and Lampson's Flat (Middle Sierras, 1800 ft.)—(Blaisdell); Pomona, Pasadena, San Bernardino (Fenyes) and Catalina Island (Fenyes).

The following bibliography is not complete, but contains, I think, all useful references.

BIBLIOGRAPHY AND SYNONYMY.

Notiophilus Dumeril.

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4. *N. borealis* Harr. l. c.: *punctatus* ‡ Lec. Ent. Corr. p. 213, note.

5. *N. simulator* n. sp.

6. *N. novemstriatus* Lec. Ann. Lyc. 1848, IV, p. 450: *semistriatus* Lec. *quadrifoveatus* Harr. l. c.: *semistriatus* say‡ Putz. l. c., Crotch l. c., Schaupp, l. c.

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9. *N. obscurus* Fall. Occa. Pap. Cal. Acad. Sci. 1901, VIII, p. 207.

10 N. nitens Lec. Rep't Expl. and Surv. 1857, p. 'i; Crotch, l. c.; Schaupp, l. c.

11. *N. semiopacus* Esch. l. c. V. 25, tab. 25, f. 6: Putz. l. c.; Crotch, l. c. Schaupp, l. c.