

# REPORT ON THE MOSQUITOES OF THE COAST REGION OF CALIFORNIA. WITH DESCRIPTIONS OF NEW SPECIES.

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The writer visited California to make collections for the United States National Museum with the idea that there were but few species of mosquitoes to be found there, and those mostly well known. The larvæ of a few were desired, and these it was hoped to find. Most of the time, May 8 to July 21, was spent in the vicinity of Los Angeles, after the seasonal rains were over. The country soon became very dry, but it was evident that few of the species, so characteristic of the temporary pools in the East, exist on the coast of California, except those supplied by the periodical high tides, so that there was little loss on this account. Practically all the species belong to the group inhabiting permanent water, something of a paradox for an arid country that is supposed to have no permanent water, and where all the streams go dry. The condition is that temporary water is so exceedingly temporary that no larvæ can exist in it; all the water that gathers belongs to the permanent type, in lakes, marshes, pools in river beds, well holes, and barrels.

Eighteen species were met with in the coast region from San Diego to Eureka. The mountains were not explored. They should yield a different set of species, probably some of the temporary pool species that breed in snow water. I was told that mosquitoes were abundant and troublesome this season in the Yosemite Valley, but had no opportunity to investigate them.

## ANOPHELES MACULIPENNIS Meigen."

The "malarial mosquito" was not uncommon in marshes, though none were seen in town. Specimens were taken at Tia Juana, Mexico, Gardena, Sweetwater Junction, Laguna, San Onofre, Salinas, Guadalupe, Eureka, Sisson, and Thrall, California, mostly as larvæ in permanent water.

"This name will have to be changed. In a paper with Mr. Knab I have shown the corrected nomenclature. The California form is *Anopheles occidentalis* Dyar and Knab.

## ANOPHELES PUNCTIPENNIS Say.

Not nearly as common as the preceding, the conditions obtaining on the Atlantic coast being reversed here. In fact I am not certain that the species occurs in Southern California, the only record being a single damaged male, bred from a larva at Sweetwater Junction near San Diego. The other specimens of the species were obtained farther north, Chico, California; Portland, Oregon; Nanaimo, Duncans, and Wellington, British Columbia. Miss McCracken obtained the species, rather plentifully, near San Francisco several years ago.

## ANOPHELES FRANCISCANUS McCracken.

The species occurred less abundantly than *maculipennis* in the same locations; bred specimens were obtained from Tia Juana, Mexico; Clearwater, near Santa Ana, and Sweetwater Junction, near San Diego. Miss McCracken described the species from Palo Alto.

## PSOROPHORA CILIATA Fabricus.

A specimen is in the collection of the U. S. National Museum, taken by Mr. D. W. Coquillett in Los Angeles. I did not meet with the species, and it is quite likely that the remarkable growth of the city has destroyed the breeding places since the time that Mr. Coquillett collected there. The breeding places are temporary puddles occurring after rain, when filled by other mosquito larvæ. Such puddles probably occur in California, though I did not encounter any. They must be rare, as evidenced by the scarcity of the species breeding in them. The larvæ of *Psorophora ciliata* usually feed upon *Janthinosoma* larvæ, but as these do not occur in California they must live on *Aedes sylvestris*. The same conditions obtain in Massachusetts and northern New York, where *Psorophora ciliata* exceeds the range of *Janthinosoma*, and doubtless there also *Aedes sylvestris* is the victim.

## CULISETA INCIDENS Thomson.

Common, the larvæ occurring in rain barrels, reservoirs, etc., as well as little pools by the streams. They were never in large numbers. The species occurred everywhere up the coast, being, if anything, more abundant in Oregon, Washington, and British Columbia. Californian localities are: Pasadena, larvæ in a water box in the arroyo and in a pond in a lawn; Los Angeles, in water in a cellar; San Diego, in a road puddle fed by a leak in a water pipe and in an old water vat on a wharf; Avalon, Santa Catalina Island, in a rain-water barrel; San Luis Obispo, in an old tin can; San Francisco, in water in a cellar in the burnt district; Eureka, in various barrels; Dunsmuir, in pools by the railroad track; Sisson, in the still edge of a ditch of cold water flowing rapidly.

## CULISETA INORNATUS Williston.

This species has been going under the name of *consobrinus*, but I am unable to agree with this identification of Robineau-Desvoidy's name, and use Williston's instead. The species was scarce, but was bred from larvæ at Laguna, Eureka, and Sisson, California, and commonly at Klamath Falls, Oregon. At the latter place pairs were observed *in coïtu*, resting on the underside of some boards over water. They were captured and did not separate even in the cyanide bottle.

## CULISETA MACCRACKENÆ Dyar and Knab.

This species has been taken at San Francisco (Miss McCracken) and Eureka (H. S. Barber), but I was not so fortunate as to meet with it. The larva is unknown to me. It is the species formerly identified with the European *annulatus* Meigen.

## CULEX TARSALIS Coquillett.

A common species, but not troublesome, as the adults never bite by day and are sluggish in their attack even at night. Moreover, the species does not breed in water receptacles near dwellings, such as rain barrels. Larvæ occurred in marshes and puddles, in river beds, and even in grass in the edges of lakes. Brackish water, when standing permanently near the sea, was also a breeding place. The species extends to the north through Oregon, Washington, and British Columbia, as well as east to the Mississippi Valley.

## CULEX STIGMATOSOMA, new species.

Head with black and golden scales behind, side of occiput pale gray; eyes narrowly white behind; proboscis black with a white band a little beyond the middle; palpi and antennæ black. Thorax bronzy brown with longitudinal striation, a round whitish spot on each side at the middle, from which an obsolete pale stripe runs backward; sides sparsely pale yellowish scaled, the integument greenish at the bases of the legs. Legs black, the femora whitish below, no white lines above; tibiæ black with a small white apex and a long whitish line within; tarsi black, a white ring at base and apex of each joint, including the terminal joint. Abdomen black, with broad white bands on the bases of the segments above, whitish scaled below with a row of median segmentary round diffuse black spots. Wing scales narrow, entirely black, not forming spots.

Three hundred and twenty-two specimens, Pasadena, California, larvæ in a pond in a lawn; Laguna, larvæ in a well hole by the edge of a lake; San Diego, in an old water vat on a wharf; Sweetwater Junction, in pools in a stream bed; San Luis Obispo, in a pool in a rocky canyon (A. N. Caudell); Avalon, Santa Catalina Island, in a rain-

water barrel; Chico, in a horse trough (A. N. Caudell); Plant Introduction Garden, near Chico, in a barrel in a small stream; Klamath Falls, Oregon, a captured specimen.

*Type*.—Cat. No. 10008, U.S.N.M.

The larva falls in the table<sup>a</sup> with *picipiens* and *cubensis*; it has the tube five times as long as wide, somewhat fusiform in shape, the pecten with about 11 teeth; lateral hairs of the third and fourth abdominal segments in threes.

This species has, no doubt, been confounded with *tarsalis* Coquillett, but it differs conspicuously in the coloration of the underside of the abdomen, which has only a row of round black spots, while in *tarsalis* there is a series of doubly bent transverse bars.

#### CULEX ERYTHROTHORAX, new species.

Head golden, reddish scaled behind, the eyes with a narrow white border; proboscis blackish; palpi red brown; antennæ black. Thorax light red, the scales fine, golden brown, striped by two impressed discolorous areas in the membrane; sides light golden scaled; legs blackish, the femora and tibiæ broadly pale below, unbanded. Abdomen black above, mixed with pale ochereous scales, the bases of the segments with rather narrow pale ochereous bands mixed with a few dark scales; beneath with pale ochereous scales and golden hairs.

Eighty specimens, Nigger Slough, Gardena; slough at San Onofre; Sweetwater Junction, swamp full of reeds; Guadaloupe, slough covered with reeds (A. N. Caudell); Salinas, California, a pool in a river bed choked with vegetation.

*Type*.—Cat. No. 10009, U.S.N.M.

The adults could only be taken in the midst of the tall reeds that covered shallow sloughs by wading into the water. A person sitting on the bank was immune from their attacks, but among the reeds they bit viciously in the daytime. The larvæ occurred among the reeds, resting quietly at the surface in the *Lemna*, though fish were present in all the sloughs. *Culex tarsalis* and *Anopheles* were generally present also, the mass of vegetation doubtless shielding them from the fish.

#### CULEX CUBENSIS Bigot.

This common house mosquito occurred in the South, but soon became scarce and finally absent northward. The localities are: San Diego, larvæ in an old water vat on the wharf; National City, in a rain barrel; Sweetwater Junction, in pools in a stream bed; Indio, in a water barrel and a drain, the adults common and a nuisance at night (A. N. Caudell); Coachella, in a pond; Laguna, in a well-hole by a lake;

<sup>a</sup>Journ. N. Y. Ent. Soc., XIV, 1906, p. 206.

Avalon, Santa Catalina Island, in a rain-water barrel; Los Angeles, in water in a cellar; San Luis Obispo, in an old tin can. No specimens were taken any farther north.

CULEX TERRITANS Walker.

The larvæ occurred sparingly in permanent water, when clear and cold; no adults were taken except those bred: Pasadena, in a wooden water box in the arroyo, at Devil's Gate: in a large clear pool behind a clay dam in the arroyo at the Ostrich Farm; Sisson, in a springy, grassy meadow and in roadside puddles.

AEDES VARIPALPUS Coquillett.

The larvæ occurred in holes in live-oak trees in the arroyo at Pasadena. Farther north, where the oak does not grow, the species seems addicted to the alder; the conifers do not form holes suitable for the larvæ to breed in. Adults were taken at Dunsmuir, California; Ashford, Oregon; Seattle, Washington; Vancouver, Victoria, Nanaimo, and Wellington, British Columbia. Unlike any other North American species (except *Stegomyia calopus* Meigen), the males are attracted to the person as well as the females. While they can not bite, they occasionally alight, and several were so taken, supposed at first to be females about to bite. While sitting in the woods near Victoria, British Columbia, the writer observed a small swarm of males which gathered before him and continued to dance, one occasionally alighting for an instant, as long as he remained there. During this time two females came to bite and each was immediately seized by a male, the pair flying off in a downward direction in copulation, which lasted apparently but a few seconds.

AEDES SPENCERI Theobald.

Recorded from California by Miss Ludlow.<sup>a</sup> The species ranges with *curriei* in the North and should occur in California. I have not taken any specimens. The larva has never been found.

AEDES SYLVESTRIS Theobald.

Quayle gives this as occurring in California,<sup>b</sup> and no doubt with correctness, as it is known to me from Arizona. It is probably the species that forms the prey of *Psorophora ciliata* as larvæ.

<sup>a</sup> Medical Record, Jan. 30, 1906.

<sup>b</sup> Bull. 178, Agr. Exp. Sta., Univ. of Calif., 1906, pp. 52, 55.

## AEDES VITTATUS Theobald.

Specimens so labeled by Mr. Coquillett have been taken at Eureka and Fieldbrook by Mr. H. S. Barber, May 22 to June 6, and one at Pacific Grove by Miss McCracken, July 2. Mr. Theobald described *vittata* from Pecos Canyon, New Mexico. We have three specimens from that place, sent by Mr. T. D. A. Cockerell, two of which are *sylvestris*, but the third appears to be Theobald's recent species. It agrees with his description except that the subcostal and first long veins are rather feebly white scaled. This character varies a good deal, and I am inclined to accept the identification. Mr. Barber, fortunately, took a male at Eureka, the hind tarsal claws of which are uniserrated as described by Theobald. The genitalia agree with those of *abfitchii* Felt.<sup>a</sup> No larvæ have been obtained in California, but the species was bred by me at Kaslo, British Columbia, and the larvæ agree with those of *abfitchii*. *Abfitchii* Felt, then, will be referred as a synonym of *vittata* Theobald, and the larva which has been attributed to *vittata* by Theobald will best be placed under *Culiseta incidens* Thomson. Everything points to this as an error of association.<sup>b</sup> The larvæ were collected by Messrs. Grabham and Cockerell in the latter part of June, a time when the larvæ of *vittata* (*abfitchii*) would have all disappeared. *C. incidens*, however, would then be flourishing and it might have been met with in any barrel or pool. *Incidens* is recorded in Mr. Theobald's paper, but there is no mention of the larva. The only other larva mentioned is that of *Culex tarsalis* (*kelloggi*), which is also a Summer species, occurring with *incidens*. These two larvæ are the ones always met with through the West, and are certainly the ones encountered by Messrs. Grabham and Cockerell, who, through some error, have attributed the *incidens* larvæ to the new species, *vittata* Theobald.

## AEDES SQUAMIGER Coquillett.

This curious species lives in the salt marshes, in water left by the highest tides. Adults were taken at National City and Redondo Beach, and larvæ were twice obtained at the former place. It has also been taken around San Francisco Bay (McCracken; Quayle), but has not been observed farther north. Although the adult is so different from *quaylei* Dyar and Knab, the larva is almost identical,

<sup>a</sup>Dyar, Journ. N. Y. Ent. Soc., XIII, 1905, p. 186; Felt, Bull. 97, N. Y. Sta. Mus., 1905, pl. ix, fig. 1.

<sup>b</sup>See Dyar, Journ. N. Y. Ent. Soc., XII, 1904, p. 173; Dyar and Knab, Journ. N. Y. Ent. Soc., XIV, 1906, pp. 193, 203.

the two falling together in the table<sup>a</sup>. However, *squamiger* has multiple head hairs, while they are simple in *quaylei*, and there are some other differences in detail.

#### AEDES DAMNOSUS Say.

Larvæ were taken on the salt marsh at San Diego at the time *squamiger* was flying. Again, when *squamiger* was in larva, the *damnosus* were on the wing, their hatching and development following more immediately the inundation of the upper reaches of the marsh by the monthly tides than in the case of *squamiger*. I found the larvæ again at Carpinteria, near Santa Barbara, having just hatched in a high tide that filled the marsh. The species was not seen farther north, being replaced by *quaylei*. The habits of the larvæ differ somewhat from the *damnosus* of the Atlantic coast. There they inhabit pools removed from the immediate action of the tides, often largely or wholly fresh, though near the sea. In California they frequented the immediate tide water and developed faster than the other associated species. The difference may be due to climatic causes, as there are no partly or wholly fresh pools in California, all the water on the marsh coming from the sea, except the river channels, which are unfit for breeding.

#### AEDES QUAYLEI Dyar and Knab (*lativittatus* Coquillett).

The salt marsh species of the Pacific coast was not encountered south of San Francisco Bay. It was common in all suitable places farther north. These places are rather widely separated, as most of the coast is steep or rocky and forms no tide-water marshes. Larvæ were found in tide-water pools at Eureka, California, and Tacoma, Washington. The adults were taken also at West Seattle, Washington; Stanley Park, Vancouver, and Duncans, British Columbia. The dorsal thoracic band of dark brown is usually broad, but varies, in one specimen from the salt marsh being very narrow. This species is far less troublesome than its Atlantic representative, *Aedes sollicitans* Walker, although perhaps the most annoying of the California mosquitoes in the daytime. In Stanley Park, Vancouver, British Columbia, the species was really a nuisance in a limited area, though the adults had probably not flown over a mile from their breeding place at most. Miss Ludlow's record of the European *dorsalis* from California<sup>b</sup> probably refers to this species or to *curriei*. It is not probable that any European mosquito occurs in North America, except the domesticated *Culex pipiens* and perhaps the malarial *Anopheles*.

<sup>a</sup> Journ. N. Y. Ent. Soc., XIV, 1906, p. 191. Larvæ collected by Mr. Quayle and sent to Professor Smith and to me were invariably determined as *curriei* (*quaylei*), as we all supposed *squamiger* should have a very distinct larva. See Grossbeck, Can. Ent., XXXVIII, 1906, p. 129.

<sup>b</sup> Medical Record, Jan. 20, 1906.

## AEDES CURRIEI Coquillett.

Adults which appear referable to this species were taken at Thrall, California, and Klamath Falls, Oregon. They are inseparable from *quaylei* by the dorsal marking of the thorax, as in one specimen the stripe is as broad as in the usual *quaylei*, in another narrow. There are, however, less black scales on the wings in these *curriei*, and I am reluctant to believe that they can be the same species as the salt marsh form. The larvæ, unfortunately, were not found, but we have them from Grand Junction, Colorado, collected by Mr. E. P. Taylor, and from Ithaca, New York, collected by Mr. O. A. Johannsen. These larvæ differ from *quaylei* in the structure of the comb, the scales of which end in a single stout spine. It is probable that the Californian ones will be found to have the same structure and thus be distinguishable from both *quaylei* and *squamiger*. The larvæ appear to come early, perhaps in the first temporary pools, and have but a single annual brood. The species was apparently absent from southern California and the coast region.

## STEGOMYIA CALOPUS Meigen.

Mr. Knab tells me that he has seen a reference to the "yellow fever mosquito" as occurring on the coast of California. It is certainly not a native of the State. I did not meet with it even in the wharf vats at San Diego, which would seem the most likely place.

## MANSONIA SIGNIFER Coquillett.

This has been recorded from California by Miss Ludlow. I have not seen any specimens. The larvæ are well known inhabitants of hollow trees, but our other records do not carry the species west of Missouri.

## URANOTÆNIA ANHYDOR, new species.

A single larva was collected in a swamp full of reeds at Sweetwater Junction, near San Diego, which died before reaching home. Mr. Caudell and I made a special trip to the swamp later to get more larvæ, but it had gone dry, leaving little puddles of dying fish and a great quantity of *Anopheles* larvæ, all of which no doubt died within twenty-four hours.

*Larva*.—Head rounded, scarcely longer than wide, neck circular, the occiput oblique, roundedly angled at the side, then nearly straight, the front margin broadly, squarely truncate; labrum deeply excavate each side of the middle, forming a triangular horn-like prominence in the middle and one on each side, midway between the central one and the antennæ. Eyes large, semicircular, transverse; two approximate multiple hair tufts above and within the eye, another on

the lower part of the front on each side; a large multiple tuft about base of antennæ. No trace of the usual thick, club-like hairs; if they are broken, the insertions are not visible. Antennæ small, not exceeding the mouth brush, conically tapered on basal two-thirds, a few spines within, a single hair at about the basal third; four terminal digits, all long and pointed, nearly equal. Deep brown, nearly black, lighter at the margins of the eyes. Thorax nearly circular in outline, flattened; a minute double prothoracic subdorsal tuft, a larger lateral 2-haired tuft from a tubercle and a subventral tuft; mesothorax with a minute multiple subdorsal tuft in the disk, a large lateral one from a small, thorn-shaped tubercle and a large subventral tuft; metathorax with the subdorsal tuft many-haired and long but very fine, lateral tuft with four feathered hairs and a simple one from a thorn-like tubercle. Abdomen submoniliform, rather slender; a single long lateral hair on the first segment, two on the second, from large tubercles, the subdorsal hairs fine and stellate: on segments 3 to 8, the hairs are fine, in substellate bunches, but long, as long or longer than the diameter of the body, both subdorsal and lateral. Lateral comb of the 8th segment an irregularly quadrangular plate, reaching near the dorsal line, the nine short teeth set on its posterior edge on the lower two-thirds, thorn shaped, with fine lateral feathering; a single hair and two tufts behind the plate, the upper with a large tubercle. Air tube straight and not tapered, four times as long as wide, light brown, with a narrow black basal ring; a single tuft slightly before the middle, from a raised tubercle, just beyond the pecten, which has 16 teeth, broad, finely feathered, pallid. Anal segment ringed by the plate, about as long as wide, the chitinous ring excavated below to admit the short ventral brush; the brush has few tufts and is surrounded by a narrow chitinous band which joins the ring on the ventral line; a fringe of fine spines on the posterior edge of the plate. Dorsal tuft, a group of long hairs on each side. Anal gills small, slender, about as long as the segment, apparently four in number.

*Type*.—Cat. No. 10010, U.S.N.M.

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