BULLETIN

DE LA

SOCIÉTÉ ENTOMOLOGIQUE

D'ÉGYPTE

FONDÉE LE 1er AOUT 1907

Fatti non foste a viver come bruti,
Ma per seguir virtude e conoscenza
DANTE

Année 1916

1er Fascicule : Janvier-Mars

LE CAIRE
IMPRIMERIE PAUL BARBEY
1916

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SOCIÉTÉ ENTOMOLOGIQUE D'ÉGYPTE

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Abonnés

The Imperial Entomologist, Agricultural Research Institute, Pusa (Bihar), India.

The Treasurer, Agricultural Dept., Nairobi, British East Africa.

Liste des Sociétés qui ont accepté l'échange de leurs publications contre les publications de la Société Entomologique d'Egypte.

Algérie.— Société d'Histoire Naturelle de l'Afrique du Nord, Faculté des Sciences d'Alger, Alger.

Angleterre.— The Imperial Bureau of Entomology, Review of Applied Entomology, 89, Queen's Gate, London S.W.

Novitates Zoologicae, Tring Herts.

Australie.— The Entomologist's Office, Department of Agriculture, Sydney, N.S.W.

Egypte. — Société d'Histoire Naturelle d'Alexandrie, B.P. 1138, Alexandrie.

Ministère d'Agriculture, Bibliothèque, au Caire.

Canada.— Entomological Society of Ontario, Ontario.

Espagne.—Junta para ampliacion di Estudios, Moreto 1, Madrid.

Real Sociedad Espanola de Historia Naturale, 74, Alphonso XII, Madrid.

Etats-Unis. — Buffalo Society of Natural Sciences, Buffalo.

The Library of the American Museum of Natural History, Central Park, 77th Street, 8 Avenue, New-York.

New-York Entomological Society, Eastern Parkway, Brooklyn, New-York.

Academy of Natural Sciences, Entomological Section, Lagon Square, Philadelphia.

American Entomological Society, Lagon Square, Philadelphia.

The United States Department of Agriculture, Washington, D.C.

United States National Museum, Smithsonian Institution, Washington, D.C.

Smithsonian Institution, Washington, D.C.

France.—L'Echange, Digoin (Saône et Loire).

La Feuille des Jeunes Naturalistes, 3, Rue Fresnel, Paris (16me).

La Revue d'Entomologie, 3, Rue Choron, Caën (Calvados).

La Revue Scientifique du Bourbonnais et du Centre de la France, Moullins (Allier).

Société d'Etudes des Sciences Naturelles, 6, Quai de la Fontaine, Nimes.

Société Linnéenne de Bordeaux, Athenée, 53, Rue des Trois Conils, Bordeaux.

Société des Sciences Naturelles de l'Ouest de la France, Nantes (Loire inférieure).

Société Entomologique de France, Hôtel des Sociétés Savantes, 28, Rue Serpente, Paris.

Société d'Etudes Scientifiques de l'Aube, Carcassonne (Aube).

Italie.—Museo Civico di Storia Naturale, Genova.

Società dei Naturalisti, 48, S.Sebastiano, Napoli.

Accademia Scientifica Veneto Trentino Istriana, Padova (Veneto).

La R. Stazione di Entomologia Agraria, 19, Via Romana, Firenze.

Laboratorio di Zoologia Generale e Agraria, Napoli (Portici).

Mozambique.— Reperticao de Agricultura de Provincia di Mocambiqua, Laurenzo Marques.

Portugal.— Société Portugaise des Sciences Naturelles, 144, Rue Santa Martha, Lisbonne.

Russie.— Société Entomologique de Russie, Moika 96, Palais Ministère d'Agriculture, Petrograde.

Revue Russe d'Entomologie, Uspenskij N° 3, Petrograde.

Suède.— K. Swenska Veienskapsakademien i Stockolm, Stockholm.

Entomologiska Foreningen, Brottninggaten 94, Stockholm.

Kgl. Vetensk. och Witterh. Samhalle, Goteborg.

Suisse.— Schweizerische Entomologische Gesellschaft, Bern.

Naturforschende Gesellschaft, Zurich.

Internationaler Entomologenverein, (Societas entomologica, M. Ruhl), Zurich.

Pour changement d'adresse, erreur ou omission, s'adresser à Monsieur le Secrétaire Général, Boite Postale N° 430.

Séance du 12 Janvier 1916

Présidence de M. le Dr Walter Innes Bey

Modifications aux Statuts.

Il est décidé d'ajouter à la fin de l'Article 2 des Statuts :

Les fonctionnaires du Gouvernement et les employés de la Société Sultanieh d'Agriculture travaillant dans les Services Entomologiques, et recevant des appointements inférieurs à L.E.12 par mois, pourront être admis à faire partie de la Société au titre de membres «Associés» s'ils ont obtenu leur diplôme à l'Ecole Sultanieh d'Agriculture du Caire.

Ils devront être présentés et élus comme les membres titulaires.

Ils recevront toutes les publications de la Société.

Ils n'auront pas droit de vote.

Ils ne pourront remplir aucunes fonctions dans le Bureau.

Leur cotisation annuelle sera de P.T. 25.

Les associés n'auront pas droit à un diplôme.

Tout membre associé peut devenir membre effectif en se conformant aux Statuts et Règlements prescrits par la Société.

Communications

Observations sur *Sphenoptera trispinosa* KLUG

(Col. Buprestidae)

par M. ANASTASE ALFIERI

En visitant périodiquement des *Sesbania ægyptiaca* PERS. — arbustes que les fellahs nomment *Seysebàu* et qu'ils emploient fort souvent pour clôturer leurs champs —j'ai pu observer que les larves de la *Sphenoptera trispinosa* vivaient dans les tiges des *Sesbania*, de préférence vers le bas de ces plantes.

La tige attaquée prend, suivant l'importance des dégâts, une teinte brunâtre sur une surface plus ou moins étendue. Souvent cette surface est molle au toucher, par suite des ravages faits en dessous. Quelques fois il se produit sur l'écorce une fente longitudinale plus ou moins grande par laquelle il se dégage un liquide qui devient visqueux et noircit en desséchant. Si la fente est assez importante l'on apperçoit à l'intérieur des matières jaunâtres qui sont les déjections des larves.

Au début, le cycle évolutif des jeunes larves est limité entre l'écorce et l'aubier qu'elles sillonnent de préférence de haut en bas. A mesure qu'elles grandissent les larves s'enfoncent plus profondément dans le bois et ce sont alors des galeries qu'elles creusent.

Des captures de l'insecte parfait faites à Choubrah pendant les mois de Juin à Novembre 1915, à Embaba en Décembre 1907, prouvent que *Sphenoptera trispinosa* n'a qu'une seule génération par an.

Outre ces observations sur la biologie des larves en voici quelques autres concernant les mœurs de l'insecte parfait :

Contrairement à ce qui a lieu en général chez les autres insectes qui regagnent leur retraite bien avant la fin du jour, *Sphenoptera trispinosa* ne semble nullement disposé a quitter l'extrémité de la branche sur laquelle il termine sa journée.

Pendant le jour cet insecte se tient bien cramponné à la branche à l'aide de ses six pattes. Ses antennes sont le plus souvent ramenées sous la tête et sous le prothorax et, lorsque ses grands yeux lui signalent l'ennemi, il s'empresse de tourner autour de la branche pour se dérober à la vue. Pendant le crépuscule, au contraire, ses pattes postérieures sont relevées et ses antennes sont portées en avant afin de pouvoir déceler le moindre danger qui le menace.

En approchant de l'insecte un fêtu de paille j'ai constaté qu'aussitôt il ramenait ses antennes sous lui et ses pattes postérieures abaissées lui permettaient de reculer et de se porter du côté opposé de la branche où il gardait une immobilité absolue. Quelques instants après, ayant éloigné le fêtu de paille et m'étant tenu immobile moi-même, j'ai observé que l'insecte, estimant tout danger passé, reprenait sa première position et ne cherchait plus à cacher ses appendices.

Il serait intéressant de savoir si l'insecte agit de la

même manière quand il fait complètement nuit, mais l'obscurité est le grand obstacle pour des observations de ce genre.

Notes on a Machine to kill Gelechia larvae by Hot-Air and the Effects of Heat on Gelechia larvae and cotton-seed.

by Dr Lewis Gough

In January 1914 Mr. Storey and I published the results of a series of experiments made to discover a method of treating Cotton-seed in order to kill Gelechia larvae without injuring the seed.

As a result of these experiments two machines were constructed and erected at the State Domains at Sakha. These machines were, firstly; a fumigating apparatus built to our design by Messrs T. Cook & Son, Bulac and, secondly, a machine acting by Hot Air, designed and constructed by Mr. Crovisier of the State Domains.

Both Machines were demonstrated to ginners and other persons interested in June 1914. Our fumigating machine fulfilled all that was expected of it, killing the larvae without damaging the seed, at a price that would not be exorbitant. It however did not meet the approval of the ginners because the gas we were using, Carbon bisulphide, is explosive when mixed with air, and the ginners were afraid that its employment might mean a

rise in the cost of their insurances. The Hot Air machine also proved a success, but was objected to on account of the huge space it required and its somewhat limited output.

Both these machines were intended as models only, and were intended to demonstrate a principle. That they failed to raise much interest was because no one was compelling the Ginners to undertake the destruction o-worms in cotton seed and consequently they were adopf ting a waiting attitude before introducing costly machinery.

The results of the meeting showed that Ginners would object more to any machine employing a poisonous or explosive gas than to a machine whose action was based on the application of heat. The Ministry of Agriculture consequently decided to elaborate a machine on the latter lines and to have a working model erected.

The contract was given to Messrs T. Cook and Sons, Boulac, in January 1915, and the machine was expected to be delivered by the end of February. Owing to the war delivery was not actually made until November 1915.

The machine is really a very simple one. In its main lines it consists of a furnace for the generation of the hot air, a hot air chamber though which the seed passes, and a motor.

The hot air chamber is a rectangular box, of iron, isolated on the outside by asbestos to avoid loss of heat. Internally there are four endless bands made of iron chains, with trays on which the seed is carried. By a contrivance the seed after having been carried nearly the whole journey of the upper surface of the upper

part of a band is discharged onto the upper surface of the lower part of the same band, from here after travelling nearly the whole journey it is again discharged onto the upper surface of the upper part of the next band and so on until finally it is discharged into an Archemedian screw conveyor which carries it into the sacking exit.

The seed is fed in at the top of the machine by an automatic hopper, which drops in exactly the quantity of seed required to make a layer one seed deep on the endless bands.

A fan situated near the feed in causes a continuous draft of air to circulate through the machine. The air is exhausted from the hot air generator, a brick chamber surrounding the furnace.

The temperature is regulated by a damper which opens or closes by means of a screw. This damper is interposed between the hot air generator and the hot air chamber. A thermometer passing into the body of the hot air chamber indicates the heat of the air at that part of the machine, and is used in regulating the temperatures. By opening the damper as soon as any indication of a fall is evident, and by closing it as soon as a rise commences it is easily possible to keep the machine regulated to + or - - 1 2 degree of the desidered temperature. This regulation could of course be made automatic if necessary. We have not fitted an automatic control on account of the extra expense, our funds not being very large.

In working the machine the following factors have to be considered.

1) The outside temperature the temperature of the seed.

2) The time required to pass through the machine.
3) The temperature the machine is regulated to give.
4) The temperature of the seed at the exit.

A few deductions are fairly obvious,

The principle underlying the working of the machine is to heat the seed enough to kill the worms, but not to injure the seed.

The worms apparently die at a temperature somewhere near 50°, the seed not till it has reached a temperature of about 65°. If it were possible to make the machine have a uniform temperature of 50° and to allow the seed sufficient time to reach this temperature, all worms would be killed without any injury to the seed.

In order to economise time and to increase the output the time allowed for the passage is shortened to some prearranged unit. The time is then left unchanged and the temperature regulated in such a way as to ensure that the seed shall be subjected to sufficient heat to bring its internal temperature somewhere between the critical temperature for the worms and for the seed.

In our experiments the time allowed has been 9 minutes, 7 minutes and 5 minutes. It is intended to test 3 minutes as soon as circumstances permit.

The following data were obtained in winter weather (temperature 10-25°).

At 9 minutes speed, the usable temperatures have been found to lie between 75-80° and 85-90°. That is to say 75° killed 96 % of the worms, 80° kills 100 % of the worms, 85° does not yet affect the seed and 90° can be reckoned to kill about 10 % of the seed.

At 7 minutes speed the usable temperatures lie between 85-90° and 100-105°. 85° killing 98 % of the worms,

90° killing 100 % of the worms, 100° not affecting the seed 105° killing about 10-20 % of the seed.

At 5 minutes speed the usable temperatures lie between 105 - 110° and 115 - 120°. Here 105° kills 96 % of the worms, 110° kills 100 % of the worms, 115° does not yet affect the seed 120° kills less than 10 % of the seed.

In practice one adopts the lowest temperature found to kill all the worms, and thus works well within the safety temperature for the seed. As the machine regulates to + 1/2° and might be allowed to rise about 20 times that amount without danger to the seed or to fall 10 times that amount without leaving more than 2 % of the worms alive it will be seen that the machine can be worked with perfect safety. Wet seed is not more affected than dry.

As a proof of our perfect confidence in our hot air machine it can be stated that we are executing orders for seed for exportation to their African possessions for the Italian Government, and have an order for treating seed intended for exportation to the Sudan.

Séance du 2 Février 1916

Présidence de M. le Dr Walter Innes Bey

Nominations :

M. Antoine Laiss-Leimburg, professeur aux Ecoles Royales Italiennes de Boulac, est nommé membre titulaire.

Messieurs Neguib Iskander, Ragheb Abdel Malek, Moustafa el Dib, Mohamed Zaki, du Ministère d'Agriculture, sont nommés membres associés.

Communications

Les Parasites de la *Sesbania aegyptiaca* Pers.

par M. Anastase Alfieri

Pour constituer une série (1) des insectes attaquant la *Sesbania* il m'a paru intéressant de citer trois autres parasites, l'un se nourissant des fleurs et les deux autres des graines.

Les fleurs de la *Sesbania* sont attaquées par la chenille du *Polyommatus baeticus* L.

(1). Vide Bull. Soc. Ent. Egyp. 1916, fasc. 1, p. 15

Les œufs de ce Licænide sont pondus le plus souvent sur les jeunes bourgeons, quelques fois sur le calice des fleurs et plus rarement sur les pétales. Les chenilles qui éclosent sur les bourgeons pénétrent à l'intérieur, s'en nourrissent et ne les quittent que lorsqu'il n'en reste plus que l'enveloppe extérieure et s'en vont alors à la recherche des pétales. Celles qui éclosent sur le calice des fleurs se dirigent vers les pétales dès leur naissance. Il est rare de trouver plus d'une chenille par fleur. Au début les chenilles se nourrissent de l'intérieur de la fleur, qui est plus tendre ; plus tard elles dévoreront tout ce qui est fleur sans toutefois toucher au calice. Quand elles atteignent une certaine grandeur elles ne vont plus sur les fleurs que pour se nourrir : le reste du temps elles se tiennent sur les branches. Plus elles grandissent plus elles ont tendance à se porter vers le bas de la plante, où les branches ploient moins sous leur poids. Au moment de devenir chrysalide la chenille quitte la plante et se réfugie sous les feuilles desséchées qui recouvrent le sol au-dessous de la *Sesbania*. Il n'y a pas de cocon proprement dit mais quelques soies qui retiennent la chrysalide entre quelques feuilles. Souvent aussi rien ne protège la chrysalide.

Un Hyménoptère : *Eumenes gracilis* Saussure, que j'ai capturé tenant dans ses pattes une chenille qu'elle avait anesthésiée par une piqûre, et les fourmis qui vident plus que la moitié des chrysalides jonchant sur le sol, peuvent être considérés comme ennemis des *Polyommatus*.

Ces observations ont été faites à Choubrah à partir du 3 Avril, date de la ponte des œufs observés, à fin Mai, date des premières éclosions. Des jeunes chenilles que j'avais ob-

servées en Novembre dernier appartenaient certainement à une autre génération.

Les graines sont attaquées, quand elles sont fraîches et encore dans les cosses, par un Hyménoptère de la famille des Chalcidides : *Eurytoma spec.* ? et par un Coléoptère Lariide : *Bruchus sp.* ? *fulvus* ALL. ou *dilutus* MOTS.

Il est presque impossible de reconnaître sur les cosses les traces d'entrée des larves. Les trous de sortie ont un peu plus d'un millimètre de diamètre.

Les graines attaquées ne contiennent jamais plus d'un parasite, qu'il s'agisse du *Bruchus* ou de l'*Eurytoma* ; par contre des individus de cette dernière espèce peuvent infester toutes les graines de la cosse qu'ils attaquent.

Les éclosions observées ont eu lieu pendant tout le mois de Mai, pendant lequel les *Sesbania* pullulaient d'*Eurytoma* et de quelques *Bruchus*, et en Octobre.

Pour permettre à M. E. Adair de terminer ses observations sur le développement de l'*Ameles aegyptiaca*, sa communication sera publiée dans le 3me Bulletin de 1916.

Séance du 1er Mars 1916

Présidence de M. le Dr Walter Innes Bey

Nomination :

Monsieur Charles Amic est nommé membre titulaire.

Communications

Notes on the Egyptian Honey-Bee

by Dr. Lewis Gough

The Egyptian Honey-bee, *Apis fasciata* is a very distinct species of Honey bee, differing from the European species not only in colouration and size, but also to some extent in its habits.

Most of the European species occur still in a wild state, and can still be found nesting in hollow trees or in similar places. I have not yet heard of such an occurrence in the case of the Egyptian bee, and am inclined to consider it to be a more thoroughly domestic species than any of its relatives.

In the following description of the life-habits of the Egyptian bee, I will have to mention a number of facts

already well known in connection with the other breeds, in order to point out the special peculiarities of the insect under discussion.

Like all other species of Apis, *A. fasciata* lives in communities consisting of males, females and workers; the workers being females retarded in their sexual development, and at the same time specialised for the purposes of carrying on the work of the community.

It is well known in connection with the life-history of the drones in European breeds, that the communities only tolerate drones at certain seasons of the year, and that during the rest of the year the hives contain no drones. In England, bees commence rearing drones at the commencement of the breeding season, and drones are found in the hives from the middle of May to the latter end of July, or even to the end of August. Then, as the breeding season is over, and the drones are of no more use to the community, the workers exclude the drones from the hive. In consequence of exposure, and of not being able to obtain food in the hive the drones die,

With the Egyptian bee this is to some extent different. A thriving community will be found to contain drones all the year round. During the winter they are certainly rarer than in summer, but a few are normally always present. Drone brood is actively being raised in January, and to some extent throughout the next five or six months. I have observed the slaughter of drones with Egyptian bees, but it took place in February, at a time when the community was actually rearing drone-brood. The object of the slaughter in this case was not to rid the community of useless mouths, which is considered to be the reason for the same performance in

European bees, but evidently in order to ensure the fertilisation of the expected young queens by young drones.

In the case of all Honey-bees, when a community has reached a certain maximum population, or when its nest or hive has become too small for its needs, a portion of the community flies away, taking the old queen with it and starts a new colony in a new nest. This is called swarming. Before swarming takes place certain indications serve to show the bee-keeper what he must expect. The bees cluster around the entrance of the hive, crowds of them sitting on the alighting board of the hive and above the entrance hole. Then more and more bees come out and fly around, near the hive, finally with a rush a very large proportion of the population comes out, among them the queen. Flying together in a cloud, the bees leave the immediate neighbourhood of the hive, and moving together they finally alight on some object, such as a tree or shrub. Here they form a dense cluster, with the queen somewhere in their midst. The cluster hangs free from the support, bee sitting on bee, or hanging from bee. Having settled in this way they remain quiet, sometimes for hours if left undisturbed; at the end of this time all take wing again and enter a cavity of a tree, or a hole in the earth to start a new nest, unless they have been taken and hived in the meanwhile. Before leaving the hive each bee has filled itself up with honey, in order to carry a reserve of food to its new nest, and to start building new comb. Bees full of honey rarely sting; for this reason swarms are usually easy to handle.

Swarming takes place in exactly the same way in the case of the Egyptian bee, the only difference I have

noticed being an inclination on their part to settle immediately, at a distance of only a few yards from the original nest.

If the community from which the swarm proceeded is a strong one, and has succeeded in raising several queens, it will soon send off further swarms. These are known as afterswarms and contain virgin queens. They behave in every way like true swarms. However as soon as the community has settled in a new nest, the queen flies out and copulates with a drone.

In other species of bees an afterswarm normally contains only one queen. In afterswarms of the Egyptian bee one finds very frequently many queens, up to 40 being observed. If hived without further precautions these queens would swarm again repeatedly, until the bees were divided up into very small communities.

This brings us to a new notable difference of habit. European bees very rarely raise more than six to twelve queens at a time, usually less. The Egyptian bee on the other hand usually raises huge numbers of queens simultaneously. I know of one case where over 368 queens were reared by one community. In another case a weak community reared in midwinter over 70 queens.

Examining a hive which is requeening itself, one often finds huge numbers of queens, running even into hundreds. Such a state of things never occurs in European breeds. However when more than one queen is present, one can be certain that they are all virgins. Egyptian queen bees that have been fertilised are quite as intolerant of rivals as the queens of other breeds.

It must not, however, be supposed that the queens alone take over the function of ridding the hive of sur-

plus virgin queens. I have repeatedly observed that as soon as one of the queens has been mated and has returned to the hive, the workers eject the virgin queens and prevent their returning, thus killing in the same way as they do drones.

Fertilised queens are fed by the workers in all breeds, virgin queens feed themselves. It is easy to get a hive of Egyptian bees to take care of and to feed any "reserve" queens one may have, by placing them separately in wire gauze cages at the top of the hive. I have kept reserve queens alive for weeks in this way in a hive which had its own fertile queen.

Should the queen of a hive die for any reason, the workers immediately start rearing new queens. For this purpose they require either eggs or larvae under three days old. Queen cells are normally produced at the edge of a comb. The Egyptian bee in addition often produces queen cells on bracket combs projecting from the surface of a brood comb. These bracket combs are produced in advance of requirements, and very often contain eggs, which not being required are left unattended, the larvae not being reared.

Should the queen die at a time when there are no eggs or no young brood in the hive, one or more of the workers is induced to lay, being fed and treated as a queen by the other workers. This appears to happen more freely with Egyptian than with European bees. A laying worker is very hard to find, as it differs very little from the others. But it is very easy to see when a hive has a laying worker, because she lays more than once, frequently as many as seven or eight eggs in each cell. Further, all the larvae developing from her eggs are

drones, even when raised in worker cells. In such cases the cells are too small for the larvae and pupae, and when covered in are recognisable as containing drone brood by the convexity of their capping.

In spite of being smaller insects than European bees, the Egyptian bees make cells of the same size as European bees. They can consequently utilise artificial foundation made for European bees.

The Egyptian bee does not gather propolis, and has not the unpleasant habit some other breeds have of sticking all parts of their hives together with this product.

The time required for development by Egyptian bees appears to be the same as in the case of other species.

Egyptian bees hybridise very readily with imported species, and the offspring of bastards or of cross-fertilised queens usually resembles Egyptian bees, more especially in the workers, but to a less degree in the case of queens and drones.

It has long been considered that drones are always produced from unfertilised eggs. In this case the drones ought to resemble the race to which the mother belongs. However in the case of some Californian Gold bees which were without doubt pure bred, daughter queens, crossed with Egyptian or Cypriote drones, have never raised thorough bred Californian Gold bee drones. On the contrary, their drones vary considerably in markings and colouration, but always resemble Egyptian drones more than Californian drones.

The Egyptian bee does not collect much honey, about 10 — 20 kg. per hive being quite a good return at Maadi. It has a further disadvantage when compared

with European breeds in that it refuses to work in the upper chamber of an English hive.

During the winter, Egyptian bees collect very little honey, living on their reserves ; although European and bastard bees kept in Egypt continue working.

The daily cleaning flights take place in winter at midday, in summer the daily flights take place in the morning and evening. During the hottest part of the year, very little activity is to be observed at midday.

Bastard bees with Egyptian blood, as has already been said, resemble Egyptian bees in colour. Their habits, however, are a strange mixture of the habits of both ancestors. For instance some Egyptian Goldbee bastards of mine, on requeening produced over 40 queens. These same bastards have tolerated their drones throughout the year ; like their American ancestors they produce propolis and seal up their hive with it, and they have been actively collecting honey in winter. These bastards have also the valuable instinct of working in the upper storey of the hive. They form larger communities than the Egyptian bee, and are in my opinion a great improvement on the Egyptian bee.

The chief enemies of the Egyptian bee are the Oriental Hornet and the two Waxmoths.

The hornet is the most serious of these. It becomes especially abundant in the autumn, and then appears to specialise on bees for food. Before August 1st very few hornets come to the hives, but at this date some other source of food must cease, causing them to turn their attention to bees. Native bee-keepers usually employ labour to kill hornets near the hives. The better way is of course to look for and to destroy hornets nests. The

hornets not only seize all bees leaving or returning to the hives, and kill and carry them away, but also actually enter the hives and rob brood, honey and bees. I have even lost queens this way. On one occasion a whole community swarmed out on account of the hornets in the hive. Carbon bisulphide poured into the hive made an end of the invaders, over 500 of which were found dead afterwards.

Last Autumn I did not lose any swarms by hornets, having allowed shrubs to grow up and cover the hives. The hornets did not seem to care to enter the shelter of the shrubs, and the bees escaped. In former years I have always lost 50 % of my hives on account of the hornets, the hives standing as normal in the open.

The two waxmoths also do considerable damage, and require constant attention.However, by cleaning out one's hives monthly they can be kept well under. Unfortunately it is not advisable to open hives during the hornet season, August to December, and Waxmoths get very plentiful during this period.

SOMMAIRE

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