W.A.S.

JOURNAL

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Western Apicultural Society of North America

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Publication Schedule

The Journal is published quarterly on a regularly scheduled basis:

October following the conference with a submission date for material of October 1st.

January with submission deadline of January 10th.

April with conference information and a submission date of April 1st.

July with final conference details and a submission date of June 15th.

Articles, news, letters to the Editor or President, or other items of interest are not only welcome but solicited from the membership on a regular or one time basis.

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Each state/province in Western North America is entitled to elect one Director on the governing board of the Society. Directors meet before and after each general meeting and set policy and guidelines for the operation of the business of the Society. Throughout the year they serve as the liaison between the Society officers and the members in their respective states. They are responsible for recruiting new members, keeping track of state concerns and advising the membership of their activities through this Journal. The board currently consists of the following members:

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W.A.S. Has gone On-line ! !

W.A.S. has gone on-line at the request of the board of directors. The board felt it would facilitate communications between Ron Neese, Treasurer, Mike Burgett, Program Chairman, and Russ Messing, President. This is especially true since there is a 3 hour time difference between the west coast and Hawaii. It will also keep the phone bills down. You can reach W.A.S. (Ron Neese, Treasurer) on the internet at: was@mother.com. If you have any suggestions or ideas about how to use our internet connection to better benefit, send an e-mail note to the above address. The Journal Editor should be on line early in 1996.

THE EDITOR'S CORNER

The mailing list

Please keep us informed of your *current* mailing address. We would like to insure that you receive your Journals and must have a correct mailing address to get it to you. If you move, change addresses or post office boxes, don't forget to send us a change card. Some names have had to be deleted from the mailing list as we have no valid addresses. This includes several "Life" members. This issue will go out bulk mail if we still have enough domestic members on the list to qualify. We mailed 207 Journals to domestic members the last time. We must have 200 to qualify for a bulk mailing. Foriegn (Canada and England) mail does not qualify for bulk and still must go first class.

BEE MASTERS SHORT COURSE

The 1996 Bee Masters Course will be offered February 19 - 24 at Simon Fraser University, Burnaby, British Columbia, Canada, just outside the scenic city of Vancouver.

Bee Masters is a week-long, intensive course in advanced beekeeping that has been held every second year for 44 years. The course is offered jointly by the B.C. Ministry of Agriculture and Simon Fraser University, and includes topics such as seasonal management, nutrition, queen rearing, pollination, diseases, mites, Africanized bees, pesticides, marketing, hive products (honey, pollen, propolis, royal jelly, wax, etc.), and much, much more. The course combines illustrated lectures, laboratory periods, social events, lots of discussion, and an optional final examination. Participants are expected to have previously kept bees and to have some knowledge about bees and beekeeping; hobbyists, sideliners, and commercial beekeepers are welcome, and all will benefit from and enjoy this course. Lecturers for the 1996 course include Rob Currie, Cynthia Scott-Dupree, Maryann Frazier, Mark Winston, Paul van Westendorp, Doug McCutcheon, and many others. For further program and registration information:

CONTACT: Athena Roussinos (604) 291-3649
or Penny Southby (604) 291-3854
Conference Services, The Halpern Centre
Simon Fraser University, Burnaby, B.C.
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WAS 96 WILL BE IN HAWAII !!

Yes, it is now certain. WAS 96 will be meeting in Hawaii, August 5-9, on the Big Island of Hawaii. We have been able to obtain the services of the ALBANY TRAVEL in Albany, Oregon to assist us in getting the best possible deal in travel and hotel accommodations. All of you who have paid your pre-registration fee will be contacted directly by Albany Travel to assist with your travel arrangements. As it now stands, the travel costs will include (1) round-trip air travel from one of several west coast airports (Los Angeles, San Francisco, Portland, or Seattle), (2) your hotel room for the five days of the WAS convention and, (3) a free rental car for the five days of the meeting. If you wish to contact Albany Travel directly here is some information for you:

Please speak with Mr. Paul Heins, (President) directly!!!! A free phone call will connect you with Paul (1 800 327 2699) Be sure to tell Paul that your travel is for the WAS 96 Hawaiian Adventure

Many beekeepers from all over the U. S. have signed up for this WAS convention. And we hope you will join us. Also, please remember, if you have not already paid your $200 dollar pre-registration with WAS, please do so now. This fee is separate from the costs of travel and lodging. It is meant to include the registration cost for the meeting, special meals cost (our banquet & Hawaiian "cook-out") and costs associated with several excellent side trips that will take place during the meeting.

Pre-registration fees should be mailed to our WAS Treasurer: Ron Neese 268 Pearl Way Woodland, CA 95695 tele: (916) 666 4053

An excellent program is in the works. This will be an unforgettable WAS meeting and we want you with us! ! ! ! -- Michael Burgett, Program Chairman

BEEKEEPING IN BRITISH COLUMBIA

British Columbia, the most westerly province of Canada, is very large and mountainous. It is 800 miles from the U.S. border to the Yukon boundary and 600 miles from the Pacific Ocean to the Alberta border. There are many productive valleys resulting in many sources of nectar. B.C. is heavily mineralized, the west coast being a rain forest and the interior is part of the great American desert.

I am situated in the lower Fraser Valley and our farmers grow small berries, vegetables and maintain dairy herds. The beekeepers in this area pollinate starting with blueberries in month of April and progress through raspberries and cranberries, some years getting a trip in to the mountains for fireweed honey. Our honeys are mainly white and a good beekeeper can get in excess of one hundred pounds and receive approximately $150 per hive for pollination fees. Those beekeepers who keep their bees in one area usually get more honey but less money. The southern interior is a large fruit belt, growing every kind of soft fruit including apricots, peaches, plums and apples not to mention the thousands of acres of wine grapes. The fields abound with clover and alfalfa and are irrigated, thus ensuring good seed production and lots of water white honey. Further north every valley has clover or alfalfa along with vetch and that insidious weed, Russian knapweed. Knapweed is a good honey plant but ruins pasture land. Then we come to the Rocky Mountains where a good number of our beekeepers ply their trade. The hills and valleys are filled with plants that produce nectar. Over the mountains and bordering on Alberta is the Peace River which is an extension of the prairies, here we have miles of canola, sweet clover, red clover and alfalfa. These beekeepers get the highest yield of all beekeepers in the province . Being so far north their day is almost 24 hours long and the bees never quit flying. There are 2732 beekeepers in B.C. and there 42293 colonies of bees. B.C. produces 5 million tons of honey. We are now plagued with the two mites and other problems of beekeeping . We are hoping we are too far north to be in line for the Africanized bee. Some areas of our province are so isolated that Queen raising, free of all mites. is becoming a large industry. Already some Queen breeders are selling into the U.S. Market.. The greatest number of our beekeepers are sideliners and hobbyists but the few really commercial beekeepers run the most hives. -- Gordon Kern, Lower Fraser Valley Rep. Honey Producers Assn. of B.C.

EDITOR'S NOTE: The following article is composed of highlights and excerpts from an address given by Dr. Messing at the 1995 WAS Conference in Sacramento. The complete text appears in the Proceedings of that conference.

THE APICULTURE INDUSTRY IN HAWAII

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The state of Hawaii has a longstanding, well established apicultural industry which differs in many important respects from that in any other region of the United States. This article briefly reviews the history of beekeeping in Hawaii, provides updated information on the current state of the industry, and points out both the problems and the great potentials which will be met by Hawaiian beekeepers in the very near future. This information is particularly relevant at a time when many see Hawaii poised to play a greatly increased role in beekeeping nationally and even internationally.

A BRIEF HISTORY OF APICULTURE IN HAWAII

The first colony of managed honeybees was reportedly introduced into Hawaii from California in 1857. These bees were said to be of the German black bee stock (Apis mellifera mellifera). Through subsequent swarming in the favorable tropical climate, feral colonies became widely established throughout the forested areas of the Islands. Italian honeybees (Apis mellifera ligustica) were introduced some time later, and today both feral and commercial colonies can be seen that are a mixture of the Italian and the black bee. The occasional aggressiveness of "Hawaiian" honeybees is anecdotally attributed to characteristics acquired from the German black bee, or to "hybrid vigour" as a result of German/ Italian crosses, a characteristic documented in other tropical and sub-tropical areas where both races are present (e.g., New Zealand, Fiji, Cook Islands). By 1894, Hawaii was exporting honey on a commercial scale . A symbiotic growth occurred between commercial beekeeping and cattle ranching. Cattlemen wished to see increased distribution and yield of kiawe beans (algaroba, Prosopis pallida) for cattle

feed. Honeybees increased pollination of these trees while also producing an excellent white honey crop. Also, as in the rest of the United States. increasing honey prices during World War I stimulated the growth of beekeeping as a commercial enterprise. In the first decades of this century Hawaii had some of the largest beekeeping operations in the world, with a single company on the island of Molokai producing about a half million pounds (227,000 kg) of honey in 1930, making it the world's largest producer for that year. During this period, the island of Molokai had over 10,000 hives, the tiny private island of Niihau had over 2,000 hives, and the island of Kauai had one of the state's first commercial queen rearing operations.

In the decades that followed, three factors contributed to a significant decline in the state's Apicultural industry. Firstly, the biological control of the sugarcane planthopper (Perkinsiella sacchancida) reduced the large amounts of honeydew that previously had served as an important food source for honeybees. Secondly, honey prices declined substantially following the end of World War I. Thirdly, there was an major outbreak of American foulbrood that severely decimated several of the state's largest apiaries. Molokai Ranch, for example, lost 3,500 colonies in 1937 and 1938, and subsequently abandoned beekeeping as a commercial enterprise . Some of the surviving hives on Molokai were eventually purchased by a company in Waimea and formed the nucleus of the nascent beekeeping industry on the Big Island of Hawaii.

In the late 1970's and during the 1980's, the number of honeybee colonies in Hawaii again began to increase substantially. This was probably due to a combination of factors, including increasing honey prices, increased stability of commercial operations allowing expansion, better management of (and possibly resistance to) American foulbrood, and increased availability of kiawe forage, as a result of effective biological control of a moth that had previously interfered with kiawe flowering. Honey production appears to be increasing once again almost to the highest levels ever seen in the Hawaiian Islands.

While statewide production of honey has increased to over 1.5 million pounds (> 680,000 kg) once again, this has been accomplished with less than half the total number of hives used to achieve this production level in the earlier part of the century. This represents a great increase in the average production per hive. In recent years the average yield per hive has been two to three times higher than the output of the 1950's and 60's.

BEEKEEPING TODAY:

There are eleven commercial beekeepers presently in operation in Hawaii, and about 70 hobbyist beekeepers with operations ranging from two to one hundred hives . Honey production from commercial beekeeping operations in 1990 was 1,570,000 pounds (712,780 kg). Based on our own interviews, honey production in 1990 from hobbyist beekeepers was

estimated at 10-20,000 pounds.(4,500-9,000 kg). Production from hobbyists thus accounts for only about 1% of the State's production. Of the 50 states, Hawaii ranks 41st in number of honey producing colonies, with only 10,000 colonies in the islands vs. a nationwide mean of 64,000 per state. Yet, in terms of average production per hive Hawaii ranks first, with a mean of 157 lbs (71kg)/hive, which is over two and a half times the nationwide mean of 61 lbs (28kg)/hive and one, and a half times the mean of the next closest state (Florida) at 95 lbs (43kg)/hive. However, in terms of average price paid to the producer, Hawaii was in next to last place at U.S. $0.47/pound ($0.21/kg) of honey.

Commercial beekeeping operations on the Big Island of Hawaii account for approximately 75% of the state's total honey production, with the islands of Kauai and Molokai accounting for an additional 14% and 8%, respectively. There are two large and well-established queen-rearing operations on the Big Island, while several other beekeepers rear their own queens or have much smaller operations.

In addition to membership in large national Apicultural organizations, such as the American Beekeeping Federation and the American Honey Producers Association, many beekeepers in Hawaii belong to local organizations, particularly the Hawaiian Beekeepers Association on Oahu (with approximately 19 members), and the Big Island Beekeepers Association on the island of Hawaii (with approximately 40 members). The Kauai Beekeepers Association, which was quite active in the 1970's and early 1980's is presently defunct, due largely to the fact that Hurricane Iwa destroyed many hives on the island in 1982 and beekeeping hobbyists have yet to recover.

DISEASE CONTROL

Because the State Department of Agriculture in Hawaii has no division specifically accountable for apiculture, the responsibility for inspection of honeybees falls under the Plant Industry Division/Plant Pest Control Branch. This branch has four entomologists, each located at a county seat, who oversee the inspection of honeybees in addition to their other duties. The DOA entomologist located on the Big Island (where the State's commercial queen-rearing operations ship thousands of bees to the mainland) is charged with inspecting colonies and dissecting

honeybees to certify that they are free of disease and/or mites. Brood inspection is carried out every 60 days, with annual inspection for Varroa jacobsoni and semi-annual dissection for tracheal mites.

On the other islands, beekeepers are visited on an annual basis by the county entomologist for voluntary disease inspection. Samples of honeybees are sent to the Oahu-based entomologist for dissection for Acarapis woodi, while the "alcohol shake" method is used for Varroa jacobsoni examination. The Plant Pest Control Branch is attempting to increase this annual inspection on the outer islands to at least a semi-annual level. In addition, samples of all swarms picked up by commercial beekeepers are sent to Oahu for examination. Results of all samples on all the islands to date indicate that no varroa or trachael mites occur within the state of Hawaii.

In 1985 the Hawaii Department of Agriculture established a legal ban on the importation of live or dead honeybees and used bee equipment into the state in order to exclude these acarine pests (Chapter 150A, Section 6.4). There have been no reported infringements of this ban. Although First Class mail cannot routinely be opened due to provisions of the Privacy Act, a reasonable cause of suspicion (such as the sound of "buzzing" in a package) is sufficient reason for notification of the authorities and opening of mail. Other private companies which handle package delivery have also been notified regarding the ban on honeybee importation. A sign that awareness of the ban exists is that a recent shipment of honeybees from Hawaii which were "returned to sender" was immediately reported to the Plant Pest Control Branch.

Given current levels of tourism and frequency of flights arriving into Hawaii, it would be relatively easy to bring in queen bees undetected by airport inspection personnel. (All arriving passengers are asked to fill out an agricultural declaration form, but collection of these forms is left to airline service personnel, and often is not very thorough).

Hawaii has not suffered from the inadvertent introduction of the Africanized honeybee, as has happened several times on the mainland U.S. State entomologists suggest that this may be due to the fact that very few ships come directly to Hawaii from Central or South America; rather, goods are transshipped through California ports. If the Africanized honeybees eventually spread further into California, or if shipping practices change, Hawaii may need to increase its border vigilance.

Although the state's borders are closed to the importation of honeybees, the possibility of deleterious inbreeding is not considered to be a problem. According to Page and Laidlaw, with the number of hives presently used to supply stock, inbreeding should not occur for many years. Shortly before the State quarantine went into effect in 1985, at least one beekeeper on Kauai brought in 10 to 20 different "lines" of bees of the three major types (Italian, Carniolan, and Caucasian) ftom widely dispatate mainland U.S. states. Also, since the implementation of the quarantine the two largest queen-rearing operations in Hawaii have been importing frozen bee semen of Italian and occasionally Carniolan stock for artificial insemination of queens. Along with some free mating of queens with feral drones, sufficient genetic diversity should thus be assured.

POLLINATION AND DIVERSIFIED AGRICULTURE:

The primary honey sources for commercial beekeepers in Hawaii are "kiawe" (algaroba or mesquite, P. pallida or P. chilensis), "Ohia lehua" (Metrosideros collina), macadamia (Macadamia integrifolia) Java plum (Eugenia cumini), Chtistmas berry (Schinus terebinthifolius, known in the southeastern U.S. as Btazilian pepper), "ilima" (Sida fallax), many Eucalyptus spp., "hoale koa" (Laucaena glauca) and coconut (Cocos nucifera). These sources range across a variety of climates and elevations, with "kiawe" predominating in lowland, dry areas and "ohia lehua" in high, wet areas. Honeybees are also known to visit sugar cane after fields are burned to feed on sugary exudates from damaged canes.

PROBLEMS AND POTENTIALS:

The physiography, climate, location, and unique flora and fauna of Hawaii pose problems and potentials to the State's beekeepers that are unlike those faced by most mainland U.S. beekeepers. In most respects, the climate is quite favorable for beekeeping. At 21 to 23 degrees latitude and surrounded by the moderating influence of the Pacific Ocean, relatively warm and stable temperatures prevail throughout the year. Honeybees can usually find sources of both nectar and pollen on a year-round basis, and do not need to expend much energy in maintaining hive temperatures (although high humidities may require increased work in evaporating the water content from honey). Commercial beekeepers can harvest up to three times per year, with the major harvest usually occurring around November. Hobbyists may harvest small amounts of honey any time of the year. Small amounts of honey are usually left to carry bees over occasional periods of rainy weather, but it is very rare for commercial beekeepers in Hawaii to have to feed their colonies.

The main Hawaiian islands have distinct dry (leeward) sides on their southwest, and much wetter sides on the areas facing the tropical trade winds which blow consistently from the northeast. Precipitation gradients can be quite severe, for example on the island of Kauai where the eastern summit of Mt. Waialeale receives over 1100 cm of rain per year while leeward areas 20 km away receive only 50 cm per year. Most apiary sites are located on the leeward sides of the islands between 60 and 900 meters, to avoid areas with extremely high rainfall. Hives on the windward side can be very productive (up to 200 kg of honey per hive), but the moisture greatly decreases the useful life of wooden equipment which may rot completely in 2-3

years.

The high humidity can also be a problem, as honey with a moisture content above 18% tends to ferment. Hawaiian beekeepers thus are careful only to harvest capped honey, which has had its moisture content reduced to a minimum by the bees. These climate and honey flow characteristics are also known from other tropical and sub-tropical islands.

Only a few commercial beekeepers move their colonies according to season, following the nectar flows from the winter "kona" rains on the leeward sides to the summer showers on the windward sides of the islands. A few beekeepers move their colonies from kiawe to Christmas berry to eucalyptus, with pollination stops at macadamia nuts, coffee, or melons in between.

The equable tropical climate in Hawaii is not only favorable for honeybees, but also for ants (Pheidole megacephala, Iridomyrmex humilis, and others), termites (Coptotermes formosanus or Cryptotermes brevis), carpenter bees (Xylocarpa sonorina) and wax moths (Achroia grisella and Galleria mellonella), all of which may take a toll on honeybee colonies and equipment. Unlike most locations on the U.S. mainland, there is no period of winter cold to interrupt the population growth of these pests. The marine toad, Bufo marinus, is also extremely abundant in wet areas of Hawaii and can eat great numbers of honeybees near hive entrances; thus beekeepers must raise their hives at least 60 cm off the ground to prevent damage from this predator.

As recently as 1909 it was reported that no foulbrood diseases occurred on any of the Hawaiian islands . However, American foulbrood (Bacillus larvae) became such a severe problem 50 years ago that it almost destroyed apiculture as a commercial venture on several of the islands. In the early 1950's, some evidence was presented indicating that honeybee populations in Hawaii had developed some degree of natural resistance to the bacteria, at least on the island of Molokai). Tests with Hawaiian colonies artificially infected with American foulbrood showed a significant level of innate resistance as compared with mainland populations. Today, American foulbrood is found at low levels on all the islands. With no formal hive registration or inspection program, it is difficult to estimate the extent of American foulbrood and other pathogens (e.g., European foulbrood, Nosema, sacbrood, and chalkbrood) in Hawaiian apiaries. Beekeepers and DOA inspection entomologists interviewed for this article can only state that these diseases are present at low levels and are normally controlled by proper management practices.

An Apicultural problem facing Hawaii more than mainland U.S. states involves the perception by some conservationists that honeybees in certain situations may be considered pest insects which threaten the health of populations of native (and sometimes endangered) plant species and endemic pollinating insects. Howarth has pointed out several ways in which Apis mellifera and other alien pollinators may adversely affect native Hawaiian plants, including: changing patterns of outcrossing, leading to possible hybridization with related plant species; outcompeting native pollinators, leading to population declines and depletion of the plants dependent upon them; stealing nectar without effecting pollination, thus reducing the chance of pollination by legitimate visitors; and selectively promoting the pollination of aggressive weed species (such as Lantana camara and Schinus terebinthifolius). It is recognized that these effects are not likely to be associated with managed honeybee hives, which are located predominantly in lowland agricultural areas where native plants are rare, but feral colonies are plentiful in upland native plant communities, and the Hawaiian flora is so unique and valuable that these concerns must be given due consideration.

In terms of apiculture as a commercial business venture, Hawaii has its share of problems in common with mainland U.S. beekeepers, as well as some difficulties unique to the Islands. The distance from other land masses and the relative isolation which has kept Hawaii's bees mite-free also contribute to increased shipping costs for honey exports, and to financial obstacles intimately bound up with the state's overall economy (e.g., exorbitant land costs, labor shortages). Also, it is becoming increasingly difficult to get access to good apiary sites due to increased urbanization and competition with other beekeepers, a factor capitalized upon by plantation owners who get pollination provided for their crops without paying fees. A frequently heard complaint among beekeepers is the difficulty of competing with low-cost Chinese honey which is imported by local packers.

Hawaii is one of the few states in the U.S. that does

not have a specific government office with the responsibility, the authority, and an adequate budget to register and regulate beekeeping activities within the state. Historically, some Hawaiian beekeepers have strongly resisted any additional government regulation or control, but it must be recognized that foreign markets are not likely to be opened or expanded without improved statewide survey data, particularly for acarine pests. These data are not likely to be forthcoming without appropriate legislation and the financial and enforcement capabilities of a government-funded agency.

Hawaii is also one of few states in the U.S. that does not have an academic researcher with Apicultural responsibilities within its land grant university system. Beekeepers on the mainland U.S. also often have access to research support from federal honeybee laboratories, but in most cases this work is not relevant to the unique needs and problems of apiculture in a tropical climate such as Hawaii's. Interviews with commercial beekeepers in the state point out the need for help with many research problems specific to Hawaiian ecosystems. For example, although a little work has been done on pollination biology of macadamia nut, coconut, and passion fruit, there is a paucity of knowledge about the pollination requirements of other important tropical crops grown under Hawaiian conditions, such as coffee, guava, mango, papaya, and atemoya. Integration of pollination management with pesticide use in agroecosystems is another area requiring research input. The nectar-producing potential and botanical aspects of bloom phenology for kiawe and other important forage sources for Hawaiian honeybees also requires work. Effective management of wax moths and other pests requires studies focused on apicultural practices specific to Hawaiian sub-tropical conditions.

CONCLUSIONS:

Beekeeping in the mainland United States is facing its greatest set of problems since its inception, and the nature of the industry is bound to change drastically in the next few years as both parasitic mites and Africanized bees spread throughout the lower 48 states. Because of its isolation and apparently effective quarantine system (as demonstrated by the continued absence of pest mites and the tentative acceptance of Hawaiian bees into Canada), Hawaii is poised to play a much greater role in supplying queens and package bees to apiaries throughout the mainland U.S., Canada, and other regions around the world. The state also stands to increase its market share of honey exports if prices remain stable and mainland production declines. Also, with increasing agricultural diversification the role of honeybees in crop pollination will soon be better appreciated within the state. Stronger government legislation and additional regulatory, research, and advisory personnel would increase Hawaii's beekeeping productivity and enhance its credibility as a producer of superior, mite-free bees. It is hoped that forward-looking individuals in the Hawaii State Department of Agriculture, the University of Hawaii, and the large agricultural businesses will join forces to support and promote Hawaiian honey and honeybees as a bright spot in the state's agricultural economy.

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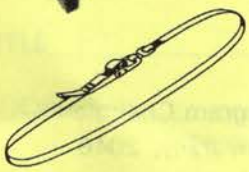

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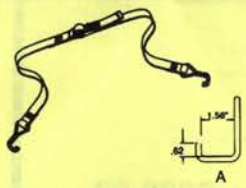

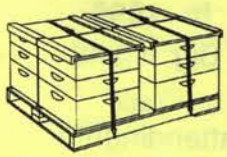

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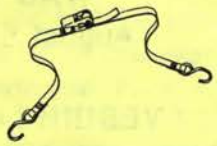

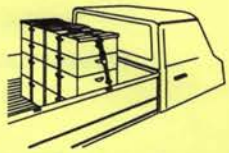

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Western Apicultural Society
P.O. Box 681
Woodland, CA 95776

If you have any questions concerning our meeting please contact the Program Chairman for WAS-96; Michael Burgett, Department of Entomology, Oregon State University, 2046 Cordley Hall, Corvallis, OR 97331-2907 {tele: (503) 737-4896 - email: burgettm@bcc.orst.edu}

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WAS IN HAWAII in 1996
August 5 - 9 on the Big Island

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And **YES**, I have enclosed my pre-registration deposit of $200.00.

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THE JOURNAL OF THE WESTERN APICULTURAL SOCIETY OF NORTH AMERICA

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