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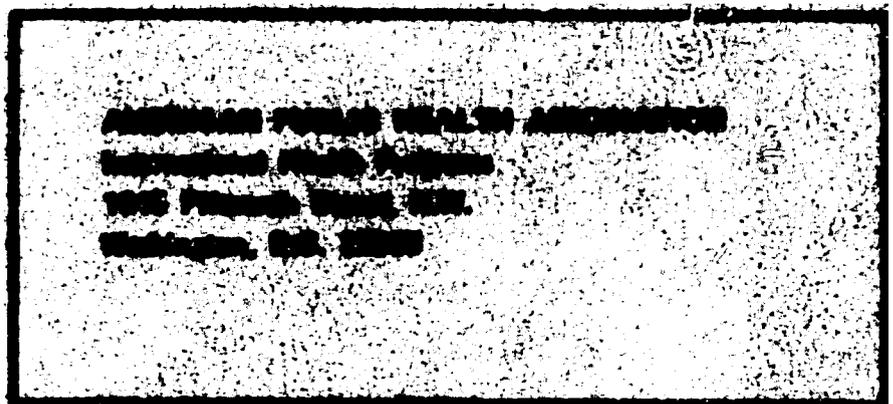
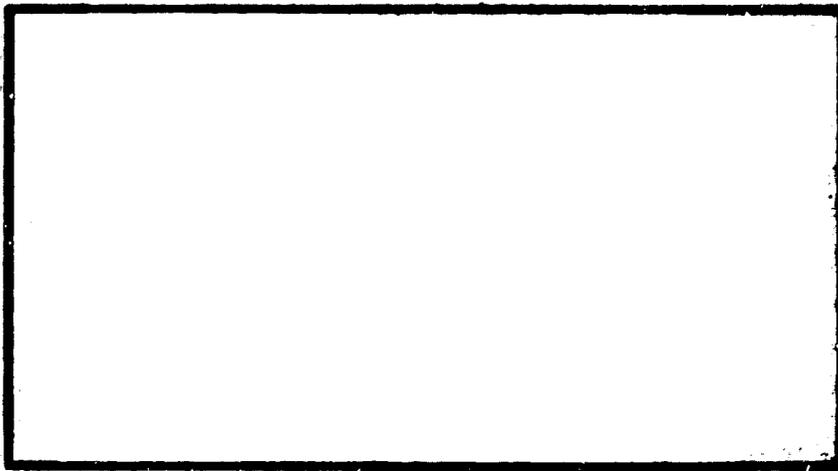
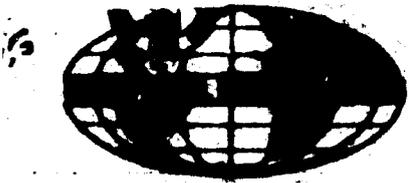
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A REPORT ON A PLAN
TO REORGANIZE AND FUND
A VECTOR CONTROL PROGRAM IN HONDURAS

A Report Prepared By:
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ABBREVIATIONS

AID	Agency for International Development
DDT	Dichloro-diphenyl-trichloro-ethene
DVC	Division of Vector Control
EPA	Environmental Protection Agency
GOH	Government of Honduras
ME	Malaria Eradication
MOH	Ministry of Health
PAHO	Pan American Health Organization
SMC	Southern Mill Creek Company
SNEM	Malaria Eradication Service
USAID	United States Agency for International Development
WHO	World Health Organization

A REPORT ON A PLAN
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A VECTOR CONTROL PROGRAM IN HONDURAS

Background

In June 1980, a team of consultants led by Mr. John Stivers assisted the Division of Vector Control (DVC) of the Ministry of Health (MOH) of Honduras in planning the proposed reorganization of the vector control program. The team also helped staff of the Human Resources Division, USAID/Honduras, to prepare the documents needed to request funding to support the program.

In 1980, the situation in Honduras differed somewhat from that found there today. At that time, a variety of insecticides was used in agriculture, with hit-or-miss effectiveness. In a large area around Choloteca the malaria vector became resistant to all available insecticides which could be used as residuals on the interior walls of homes. When the Anopheles populations in the area developed resistance to DDT (an ideal material because it has an effective wall life of six months and low mammalian toxicity) twenty years ago, a number of other shorter-lived chlorinated hydrocarbons and organo-phosphates were used as substitutes, but the vectors developed resistance to each of these products also. Finally, lacking another, even short-term, replacement chemical, the Government of Honduras (GOH) decided to give up its original goal of eradication of malaria. Its new target, at least in the areas of resistance, became control of the vector populations.

The vertically-structured, semi-autonomous Malaria Eradication Service (SNEM) was disbanded in 1978, and the new Division of Vector Control was created in the Ministry of Health. The DVC took over the existing Aedes aegypti control program and set as its eventual goal the control of all human disease-vector insect populations.

The Concept of Malaria Eradication and Control

The malaria eradication concept, developed by the World Health Organization (WHO) in the 1950s, was designed as an intensive, relatively short-term (eight-year) campaign to wipe out the parasite Plasmodia, country by country. Two methods were to be used to kill the parasite in infected humans: case-finding and drug-treatment campaigns. The infected Anopheles was to be killed by continually spraying insecticide residuals on the interior walls of all dwellings. To interrupt transmission, the residuals had to be maintained at least four years, until preexisting cases had relapsed.

The rates of applications of insecticides are calculated to provide a cumulative lethal dose to the vector during the estimated two weeks the disease incubates. During this time, although it is not infective, the mosquito might feed three or four times and then, following its normal habit of mating, lay as many as 200 fertilized eggs after each meal. A relatively small percentage of the total population of mosquitoes enters houses, but even those which do enter and are killed before they transmit the disease are able to reproduce copiously before death. Obviously, even the most successful malaria eradication program will have little or no effect on the size of a vector population.

Sri Lanka is a classic example of the potential of a tiny focus of parasites in an unabated vector population. There, seventeen cases detected and treated at the end of a malaria eradication (ME) program exploded to more than 1,000,000 cases in just a few years.

In the United States and a few other countries, malaria has been eradicated and maintained at near-zero autochthonous levels for the past forty to fifty years by mosquito-control campaigns. In these programs, most of which are organized and funded at the county level, the objective is to reduce the total mosquito population. Statistically, only a small percentage of the total Anopheles population will feed on infected humans, and of those mosquitoes, a percentage either will die of natural causes before incubation of the parasite is completed or choose non-humans for subsequent meals.

Given natural reductions of vector potential, a large initial population of Anopheles is needed to maintain malaria endemicity. Experience in the U.S. has demonstrated that transmission can be reduced drastically even in highly endemic areas by reducing mosquito populations. Normal case-finding and treatment to eliminate preexisting parasites will lead to eradication of the disease.

Mosquito Control in the United States

Continuous mosquito-control operations ensure eradication of malaria (and prevent its transmission) even when imported cases are introduced. In the last years of the Vietnam war, some 3,000 American troops returned annually to the U.S. with uncured malaria (much of which was transmitted by drug-resistant parasites). Even now, hundreds of tourists and refugees enter the country each year with the parasite. But, to date, only a single group of six secondary cases has occurred, all on a military base and all quickly controlled.

Those who oppose the maintenance of mosquito-control programs point out that it is wrong to cite the U.S. as an example because the average standard of living is higher, and housing and medical care more adequate and available,

in the U.S. than in developing countries. One must not forget, however, that the greatest improvement in the standard of living came after the control of mosquitoes. (And, perhaps, was, at least in part, a result of mosquito-control efforts.) The major remaining pockets of endemicity were wiped out in the early 1930s, when the economic depression was most severe, and before the invention and development of miracle drugs and insecticides. In that period, there was no specific cure for malaria, and the only prophylactic, quinine, was far from efficient. Residual-action insecticides had not been invented yet, and the chemical mosquito-control arsenal was limited to fuel oil, arsenates, and pyrethrum and rotenone. (The last two products were used rarely because of their cost.) No other insecticides were available, and it was with these crude tools that malaria was eradicated in the United States.

Methods Used in Honduras

The more sophisticated instruments are failing. There is no reason why Honduras, and other countries in the same situation, cannot revert to the older methods and achieve similar success. It has been argued, and with some reason, that the major disadvantage of mosquito control, as opposed to the WHO eradication method, is that, although cheaper, it must continue forever. The eradication method costs much more each year than a mosquito-control program but, theoretically, it is finished in eight years. A review of actual applications of the method reveals results to the contrary. Honduras has been following the expensive WHO scheme for more than thirty years, and it probably has at least as high a malaria rate now as it did at the beginning of the program.

This consultant has no argument with residual house-spraying to interrupt transmission where insecticides are still efficient and near 100 percent coverage can be ensured. In Honduras, DDT is still effective throughout most of the country. As was recommended in last year's report, wall-spraying should be continued in these areas. In the area around Choloteca, where the vectors are resistant to DDT and most other residuals, steps should be taken immediately to organize a mosquito-control program and to begin a survey of the prevalent mosquito species and their sources. Fenitrothion has been used effectively, but the insecticide should not be depended upon to continue to function for more than a few years before resistance appears. The period of grace should be used for careful surveying, planning, and training for mosquito control. Once the campaign is functioning, it can be expanded into other areas where DDT resistance appears, or where the program would appear to be economically practical.

Instruction and General Training

Honduras has no experience in mosquito-control operations. For this reason, it was recommended and agreed that, once the recommended entomological and vector-control equipment was in place, this consultant would return to Honduras to organize and teach a series of courses in the subject. When he arrived, however, the consultant discovered that the equipment had not been ordered and the personnel of the DVC were in the midst of a three-month course in standard malaria-eradication techniques which had been organized by the Pan American Health Organization (PAHO).

Recognizing that it was impractical to try to do the job without the necessary tools, and loath to interrupt the course, the consultant arranged to remain in Honduras only one month instead of two and to return to teach the courses after the equipment arrived. At the request of the USAID and the DVC, the consultant concerned himself with activities which normally would be the responsibility of the full-time malaria adviser.

The consultant spent one week assisting in the instruction in entomology, part of the general training course; another week was devoted to a special course for the Aedes aegypti control personnel and four new employees in the Entomology Section. The consultant also accompanied and assisted staff of the Entomology Section in performing bio-assay tests of fenitrothion in homes in the Choloteca area and in the laboratory.

Planning and Problem-Solving

Considerable time was spent in problem-solving and planning discussions with personnel of the USAID, the DVC, and other agencies. Some of the problems that were addressed are described below.

A. Fenitrothion

Fenitrothion is the generic name of the insecticidal compound O,O, dimethyl O-(3 methyl - 4 nitrophenyl) phosphorothioate. It has been demonstrated to have, for up to three months, a residual toxic effect against susceptible strains of Anopheles when it is applied to the interior walls of rural homes under field conditions. At this time, it is the insecticide of choice in Honduras in those areas where vectors are resistant to DDT.

During the past year, the DVC has been using fenitrothion from two sources. It purchased the bulk of the material from Southern Mill Creek Company (SMC) of Tampa, Florida, San Jose, Costa Rica, and London, England.

The remainder, in a quantity suitable for testing, was donated by the Sumitomo Company of Japan. Its brand name is Sumithion. The SMC product and the Sumithion are, theoretically, identical. Both are water-wettable powders. Each is supposed to contain 40 percent of the active ingredient and 60 percent of inert materials, the latter consisting of dusts and wetting agents which allow the product to remain in suspension in water.

There appears to be some difference, however, in the physical characteristics of the two batches of material. Both emit the rotten-egg smell peculiar to organo-phosphates that have been mixed with water and applied, but DVC personnel report that the odor of the SMC material is exceptionally strong and persistent. They also report that the residue of the SMC insecticide left on the walls of houses has an unpleasant yellow-brown hue to which householders object.

Chemical analyses have been done of the SMC material. They verified a content of 40 percent of active ingredient when the product was delivered, but they showed also that this figure was reduced to 31 percent after one year of storage. Similar tests on Sumithion have not been made.

It should be understood that any insecticide purchased by or for the program must meet the rigid specifications of the AID or the WHO and PAHO. These organizations caution that storage conditions have a strong effect on the shelf-life and physical state of insecticides, and they advise that program planning can and should be done to minimize storage time. They note that minor variations in the physical characteristics of the product are to be expected from production batch-to-production batch of any supplier.

B. Peace Corps Volunteers

Peace Corps Volunteers constitute a source of technical assistance which should not be overlooked by the DVC. Technically-specialized volunteers may be recruited at the request of local agencies and assigned specifically to them. Once the volunteers have been assigned, they are considered to be employees of the agency.

Several discussions on this subject were held in Honduras with Peter Lora, director of the Peace Corps, and Martha Milk, the assistant director. The consultant learned that the volunteers are brought in for specific assignments and spend their entire tours in the assigned positions, although a change is permitted at the end of six months if changes are made in their programs. According to those with whom the consultant spoke, it should be possible to recruit some volunteers with biology backgrounds who could be trained in vector control by the country malaria adviser and used in the program as regional supervisors. An official request for a specific volunteer would have to be made by the DVC; approximately one year of lead time is required.

It may be possible for the DVC to obtain some assistance from the Peace Corps. At the time of the consultant's visit, two unassigned volunteers were available. One spent several days with the entomology group. The DVC was expected to request that he be assigned to the program.

C. Long-Term Malaria Adviser

A long-term malaria adviser should be assigned to a program of this size. At the time of the consultant's visit, no one had been selected for this contract position. Unable to fulfill his expected training assignment, the consultant assumed many of the duties that usually are handled each day by a malaria adviser. No one objected to this assumption of duties. In fact, it was felt that some good was accomplished in insecticide testing, liaising with the Peace Corps, and bolstering the Entomology Section. Given the importance of this program to Honduras, and the large investment of the AID, these tasks should have been handled much earlier. They require constant follow-up by a qualified technician. The position of long-term malaria adviser should be filled by a qualified technician as soon as possible. The other USAID health advisers have more than enough responsibility for other programs, and they are not specialists in vector control. Too many important facets of the program are pending at this time, awaiting the arrival of the adviser.

D. Commodities

Even if the personnel of the DVC had not been involved in a course in eradication, it would have been impractical to attempt the proposed sessions in vector control because the necessary tools, instruments, and materials had not been procured. It was tentatively agreed that the consultant would return to present the course in August. But this may not be possible. Major suppliers were contacted by telephone late in July; they indicated that the initial procurement steps have yet to be taken. (One of the major suppliers has sent a revised catalog, with prices, dated July 1. It is likely that the other suppliers will have increased their prices since the original list was compiled and the budget estimates made. See Appendix B.) The training course should be postponed until the necessary commodities are available in the country and the long-term adviser is on board.

APPENDICES

Appendix A

CORRESPONDENCE ON CUERPO DE PAZ



ESTADOS UNIDOS DE AMERICA
CUERPO DE PAZ
EN HONDURAS
TELEFONOS: 32-1753 - 32-2541 - 32-5399



BEST AVAILABLE DOCUMENT

Nos agrada la confianza que ha renido con CUERPO DE PAZ/Honduras, para solicitar Voluntarios que trabajen en su institución, los cuales esperamos prestarán un buen servicio.

Para su conocimiento y para evitar malos entendidos en el futuro, quisieramos poner en claro varios asuntos que tratan de las responsabilidades de los Voluntarios para con la institución y vice-versa.

- Hacemos énfasis en el hecho de que el Cuerpo de Paz considera el Voluntario como empleado de su institución. Una vez que se integre a la institución anfitriona la responsabilidad de la supervisión directa del Voluntario recae en el Coordinador del Programa para lo cual trabajo.

El Coordinador de Cuerpo de Paz realizará visitas periódicas al Voluntario y a la Institución cada tres o cuatro meses y siempre que se considere necesario, para evaluar la labor del Voluntario y el progreso del proyecto. Por consiguiente, se espera que el Voluntario siga las normas del trabajo que se exigen de cualquiera de los profesionales en su oficina: presentación, horario de trabajo, elaboración de planes de trabajo, presentación de informes de actividades, etc. Por cualquier problema que manifieste el Voluntario respecto a estas normas, se le debe llamar la atención. Si no mejora, el supervisor debe de comunicarse con el Coordinador de Cuerpo de Paz.

Consideramos que el Voluntario es un recurso técnico solicitado por la institución. Por consiguiente, se espera que la institución tenga la responsabilidad de supervisar el trabajo del Voluntario, como también la responsabilidad de tomar en cuenta las sugerencias hechas por él, siempre que se consideren oportunas y apropiadas. Se espera que el personal le facilite el apoyo necesario para la realización de su trabajo.

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- No obstante lo mencionado anteriormente, los Voluntarios tienen derecho a ciertos privilegios que no tienen los demás empleados de la institución.

Estos privilegios si bien se pueden llamar así, están contemplados en las leyes y reglamentos que gobiernan nuestra institución y tiene su base fundamental en el deseo de querer rendir un mejor trabajo en pro de la institución anfitriona. Entre estos privilegios se pueden enumerar los siguientes:

- 1) Atención Médica: El Cuerpo de Paz contrata un médico local para velar por la buena salud de los Voluntarios. Cuando se enferman los Voluntarios se espera que ellos acudan a ese médico (en el caso de los Voluntarios en la vecindad de la capital) o cualquier otro médico aprobado por el Cuerpo de Paz en otras zona del país. Todo gasto médico corre por cuenta del Cuerpo de Paz. El Voluntario deberá informarle a su supervisor inmediato toda ausencia por enfermedad.
 - 2) Vacaciones: Los Voluntarios tienen derecho a un total de 15 días laborables de vacación por año, más los días feriados nacionales. En todo caso el Voluntario tiene el deber de tomar las vacaciones cuando convenga a la institución y el supervisor esté de acuerdo. Cualquier solicitud de vacaciones hecha por el Voluntario tiene que ser aprobada primeramente por el supervisor directo del Voluntario y después por el Coordinador del Cuerpo de Paz. El Cuerpo de Paz no aprobará ninguna solicitud de vacaciones al Voluntario sin la aprobación del supervisor inmediato.
 - 3) Talleres de Español: Cada Voluntario que aún no tiene la habilidad de comunicarse con facilidad en español, tiene el derecho de asistir hasta a tres talleres de español durante el transcurso del primer año de servicio. Sin embargo, la asistencia a estos talleres tiene que ser presentada por escrito y con anticipación al supervisor directo del Voluntario para su aprobación. Las fechas para asistir a dichos talleres no deberán interferir con el desempeño de labores importantes para la institución.
 - 4) Talleres Técnicos patrocinados por el Cuerpo de Paz: Una vez al año el Cuerpo de Paz patrocina un Taller Técnico para los Voluntarios. El Cuerpo de Paz notificará a la institución anfitriona las fechas de tales talleres a fin de obtener la autorización para la asistencia del Voluntario. De igual forma esperamos que la institución comunique al coordinador del Cuerpo de Paz cuando los Voluntarios tengan que asistir a talleres patrocinados por su institución.
- Hacemos énfasis en el hecho de que el Cuerpo de Paz no sólo es una institución que administra asistencia técnica, sino que también se espera-

que el Voluntario cumpla con los objetivos transculturales del Cuerpo de Paz que son los siguientes: "Promover una mejor comprensión de otros pueblos por el pueblo Norteamericano (los Voluntarios) y promover una mejor comprensión de los países anfitriones hacia el pueblo Norteamericano.

- El logro de estos objetivos transculturales depende en gran medida de ustedes, los supervisores y los empleados de la institución anfitriona, asegurando que el Voluntario esté incluido en el equipo de trabajo, en fiestas y otras ocasiones sociales. También sugerimos que cuando esté asignado más de un Voluntario, no trabajen separados del personal local, sino en forma conjunta. Nosotros consideramos que esta forma de trabajar no sólo le ayuda al Voluntario a integrarse a la oficina, sino también a desarrollar sus tareas en forma más efectiva y les facilita el aprendizaje del español en forma más rápida.

Esperamos que estos puntos aclaren el papel del Voluntario dentro de la institución, así como sus derechos y deberes con respecto a la institución y viceversa. El objetivo principal de tener Voluntarios en este país amigo, es para que compartan sus conocimientos técnicos, tomando en cuenta y respetando las normas culturales locales para el beneficio y progreso de nuestros anfitriones hondureños.

En el Cuerpo de Paz estamos siempre a la orden para contestar sus preguntas e inquietudes que tengan respecto a estas normas. Sin más por el momento, nos despedimos con muestras de nuestra más alta consideración y estima.

Atentamente,

Lic. PETER LAPA/Director
CUERPO DE PAZ-Honduras

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Appendix B
CATALOG OF BIOQUIP PRODUCTS
(July 1981)



PRICE LIST

P.O. Box 61, SANTA MONICA, CA 90406

JULY 1981

Telephone: (213) 322-6626

Telex: 194561 LSA

Cable: BIOQUIP

THIS PRICE LIST SUPERSEDES ALL PREVIOUS PRICE LISTS

Prices shown are current, subject to change without notice or prior notice.

Cat No	Description	Price		Catalog Page	Cat No	Description	Price				
		each	dozen				each	dozen			
2	1001 Insect box	9.15	100.65	6	Cornell drawers and trays	Price per unit					
	1004 Insect box	18.50	203.50			Bottom	Hooks	1	12	1--	
	1007 Insect box	5.80	63.80			1012AM	hardboard	-	23.00	22.00	21.00
	1002C Insect box		26.95			1012AF	polyethylene	-	25.50	24.50	23.50
	1002F Insect box		36.60			1012T	hardboard	-	17.25	16.50	15.75
2	1009 Insect box	5.45	59.95	1013T	hardboard	-	20.75	20.00	19.25		
	1041A Display case	17.00		7	1013AF polyethylene 4	1	12	1--			
	1041AU Display case, unfin.	15.50				1013C	hardboard	-	28.00	27.00	26.00
	1041B Display case	21.50				1013CH	hardboard	4	30.00	29.00	25.00
	10413U Display case, unfin.	20.00				Price per unit		1	12	575	
	1041C Display case	27.25				1025AM	Empty unit tray	.30	.29	.29	
	1041CU Display case, unfin.	25.25		1025HV	Tray with grid	1.10	1.05	1.00			
	Carton charge for 1 or 2 1041C/CU display case(s)	2.85		1025KMT	Empty unit tray	.27	.26	.25			
	1042H Display case	7.30	80.30	8	Cabinet prices do not include drawers or trays. Please specify choice of exterior color or finish.						
	1042J Display case	10.75	118.25		25125	Cabinet, steel, for 12					
	1043B Riker mount	1.95	21.45			Cornell drawers or trays	260.00				
	1043C Riker mount	2.25	24.75		2512F	Cabinet, plastic laminate, for 12					
	1043D Riker mount	2.85	31.35			Cornell drawers or trays	260.00				
	1043E Riker mount	3.70	40.70		25255	Cabinet, steel, for 25					
	1043F Riker mount	6.05	66.55			Cornell drawers or trays	455.00				
	1043G Riker mount	12.75	140.25		2525F	Cabinet, plastic laminate, for 25					
						Cornell drawers or trays	455.00				
						25145	Cabinet, steel, for 14				
4	California Academy drawers	Price per unit			2514F	Cabinet, plastic laminate, for 14					
	Bottom	Hooks	1	12	144	California Academy drawers	265.00				
	1010AM	hardboard	4	25.00	24.00	23.00					
	1010AF	polyethylene	4	27.50	26.50	25.50					
	1010CM	hardboard	-	23.00	22.00	21.00					
	1010CF	polyethylene	-	25.50	24.50	23.50					
			set of 1 dozen								
	1016	Hooks, with screws			3.60						
	1017	Pulls/cardholders, screws			4.90						
	1018	Cardholders, with pins			3.60						
	1019	Knobs, with adapter screws			6.50						
5	2010A	Cabinet, aluminum, for 24									
		California Academy drawers	285.00								
	2010F	Cabinet, plastic laminate, for 24									
		California Academy drawers	295.00								
	2012A	Cabinet, aluminum, for 20									
		Cornell drawers or trays	285.00								
	2012F	Cabinet, plastic laminate, for 20									
		Cornell drawers or trays	295.00								
					9	Cabinet prices do not include drawers or trays. Please specify choice of exterior finish.					
					2106F	Cabinet, plastic laminate, for 6					
						Cornell drawers or trays	170.00				
					2107F	Cabinet, plastic laminate, for 7					
						California Academy drawers	170.00				
					10	2412KD	Cornell cabinet kit	170.00			
						2414KD	Calif. Academy cabinet kit	170.00			

Cabinet prices do not include drawers or trays. Please specify choice of exterior finish.

ENTOMOLOGY

BioQuip®

Catalog Page	Cat. No.	Description	Price	Catalog Page	Cat. No.	Description	Price	
11	1010B	Calif. Academy 6 drawer kit, comp. pinning bottoms	53.00	13	1025BX	Unit tray shipper	dozen 14	
	1010BM	Calif. Academy 6 drawer kit, hardboard bottoms	53.00		1030	Pro tem block	each 1 dozen 11	
	1012B	Cornell Univ. 6 drawer kit, comp. pinning bottoms	53.00	14	2805	DC collecting light	33	
	1012BM	Cornell Univ. 6 drawer kit, hardboard bottoms	53.00		2806	AC collecting light	30	
	1028N	Foam sheets, 16 x 18" each	2.25		2807A	Replacement tube, 15 watt	7	
		carton of 2 dozen	48.60		2807B	Replacement tube, 8 watt	7	
		Special cut sizes, minimum 10 pcs. each size, per sq. foot or fraction thereof	1.65		2807M	Replacement mesh sleeve		
1029A		Chromecoat paper sheets, doz.	6.25		2815	Pigtail adapter	6	
1029B		Studio paste	quart 2.40		2808A	Battery	10	
					2814	Battery adapter	5	
				15	2862	Power pack	76	
					2862B	Replacement battery	49	
					2862A	DC jump cord	6	
					2811	Mini voltage converter	14	
12	1025AA	Unit trays	1 1.65 1.60 1.55		2851	Power pack	112	
	1025A	Unit trays	.73 .71 .69		2861A	Replacement battery	50	
	1025B	Unit trays	.58 .57 .56		2810	Power converter, 12v	53	
	1025C	Unit trays	.53 .52 .51					
	1025D	Unit trays	.50 .49 .48		16	2802A	EVS mosquito trap	each 65.00 dozen 715.
	1025E	Unit trays	.45 .44 .43			2802E	Replacement catch bag	2.70 29.
	1025J	Unit trays	.72 .70 .68			2802F	Replacement motor	1.50 16.
	1025K	Unit trays	.57 .56 .55			2802G	Replacement lamp	1.50 16.
	1025L	Unit trays	.50 .49 .48			2802H	D cell battery	.70 7.
	1025V	Unit trays	.75 .73 .71			2802K	Replacement propeller	1.05 11.
	1025W	Unit trays	.65 .64 .63			2802J	Chicken can	9.70 106.
	1025X	Unit trays	.54 .53 .52		17	2850A	Garbage can	each 10.
	1025Y	Unit trays	.51 .50 .49			2850B	3-way cord	4.
						2850C	Funnel	23.
						2850D	Light, ballast, cord, AC, 120v, 8w	31.
13	1026AK	Unit tray kit of 12	each 6.85			2850E	Vanes, set of 3	23.
	1026BK	Unit tray kit of 12	5.75			2850F	Rain drain	5.
	1026CK	Unit tray kit of 12	5.10			2850J	Mesh collecting bag	3.
	1026DK	Unit tray kit of 12	5.00			2850K	Light, ballast, cord, DC, 12v, 8w	34.
						2807B	Replacement tube, 8 watt	7.
						2809	Mercury vapor lamp	98.
						2809A	Replacement lamp, 100w	24.
	1026A	Folding unit trays	Per 100 23.75 Per 1,000 213.75		18	2875A	Malaise trap with head	181.
	1026B	Folding unit trays	23.75 213.75			2875B	Malaise trap with head	247.
	1026C	Folding unit trays	23.75 213.75			2875D	Malaise trap with head	199.
	1026D	Folding unit trays	23.75 213.75			2875H	Collecting head	42.
	1027A	Foam pinning bottoms	28.50 256.50			2875K	Malaise trap carry case	16.
	1027B	Foam pinning bottoms	18.15 163.35					
	1027C	Foam pinning bottoms	14.25 128.25					
	1027D	Foam pinning bottoms	13.20 118.80					
	1027G	Tray adhesive	pint 3.25 quart 5.50 each .20 dozen 2.00					
	1027H	Applicator brush						

Cat. No.	Description	Price		Cat. No.	Description	Price	
		each	dozen			each	dozen
1139	Altimeter	17.50		22 612NA	Insect net, aerial	7.15	78.65
1141	Pedometer	17.95		612CM	Net, heavy duty aerial	8.00	89.00
1125	Shovel	6.00		612MS	Net, medium sweep	7.70	84.70
1126	Field collecting bag	12.50		612HS	Net, heavy duty	9.00	99.00
2844	Head lantern	16.00		615NA	Insect net, aerial	7.70	84.70
		per 100	per 1,000	615CM	Net, heavy duty aerial	8.70	95.70
1130A	Glassine envelopes	1.20	10.80	615MS	Net, medium sweep	8.30	91.30
1130B	Glassine envelopes	1.30	11.70				
1130C	Glassine envelopes	1.50	13.50	625HS	Net, heavy duty sweep	11.50	126.50
1130D	Odonata envelopes	3.50	31.50				
		dozen	gross	112NA	Student net	6.30	69.30
1122A	Specimen containers	1.55	17.05	112NAA	Replacement net bag	3.60	39.60
1122B	Specimen containers	1.75	19.25	112CP	Pocket net	8.00	88.00
1122C	Specimen containers	2.40	26.40	112CPA	Replacement net bag	3.60	39.60
1122D	Specimen containers	2.90	31.90				
		each	dozen	23 212NA	Aerial net bag		3.90
1120A	Killing jar	1.65	18.15	215NA	Aerial net bag		4.35
1120B	Killing jar	1.90	20.90	218NA	Aerial net bag		4.95
1120C	Killing jar	2.20	24.20	212FA	Special aerial net bag		6.05
1120Y	Extra cartridge	.75	8.25	215FA	Special aerial net bag		6.75
1120P	Pocket killing jar	1.55	17.05	212CM	Heavy duty aerial net bag		4.75
1120PY	Extra cartridge	.65	7.15	215CM	Heavy duty aerial net bag		5.35
1121A	Killing jar	1.15	12.65	212MS	Medium sweep net bag		4.45
1121B	Killing jar	1.30	14.30	215MS	Medium sweep net bag		4.95
				212HS	Heavy duty sweep net bag		5.80
1131	Dipper	3.25		215HS	Heavy duty sweep net bag		6.60
1131H	Extendable handle	4.15					
				350A	Net ring, round		2.45
1135A	Aspirator	5.20	57.20	350B	Net ring, triangular		2.75
1135B	Aspirator	11.00		351A	Net ring, round		2.45
1135BJ	Aspirator jar & lid	.45	4.95	351B	Net ring, triangular		2.75
				352	Net ring, round		2.85
1135C	Aspirator		16.50	353	Net ring, round		3.25
2840	Beating sheet		10.25	355	Slotted lock screw		.35
2830	Berlese funnel		54.50	356	Cap screw & Allen key		.95
2870	Tangle trap adhesive	tube	2.90	357	Plastic grip		.55
		can	7.50				
						per linear yard	
2 312NA	Insect net, aerial		13.50	250A	White polyester netting		1.45
312CM	Net, heavy duty aerial		14.30	250B	Olive drab nylon netting		2.10
312MS	Net, medium sweep		14.05	250C	Off-white nylon chiffon		3.20
312HS	Net, heavy duty sweep		15.85	250E	Unbleached muslin		1.55
315NA	Insect net, aerial		14.30	250K	Tan Lumite Saran, 20 x 20		8.00
315CM	Net, heavy duty aerial		15.30	250L	Tan Lumite Saran, 52 x 52		19.50
315MS	Net, medium sweep		14.90			each	
315HS	Net, heavy duty sweep, see listed elsewhere on page		24 625HS	324	Tropics net, complete		57.75
				218NA	Extra net bag		4.95
318NA	Insect net, aerial		15.30	324A	Top segment		7.95
325NA	Insect net, aerial		22.00	324B	Middle segment		8.10
328NA	Insect net, aerial		23.00	324C	Bottom segment		7.40

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1969 Cat. No.	Description	Price	Catalog Cat. Page No.	Description	Price
4	436 Screen barrier net	26.95	27 1202B	Insect pins, elephant 100	2.1
	322AG Gambusia net	24.50		per 1000 ^a	19.0
	212AG Gambusia net bag	7.40	1202S	Insect pins, stainless 100	2.9
	339AR Aquatic net	14.40		per 1000 ^a	26.5
	339AT Aquatic net	14.70			
	332AR Aquatic net	14.85			
	332AT Aquatic net	15.15			
	358AR Aquatic net	21.50	1204B	Minutens, black per 500	5.1
	358AT Aquatic net	21.80		per 1,000	9.2
	352AR Aquatic net	21.95	1204S	Minutens, stainless 500	5.6
	352AT Aquatic net	22.25		per 1,000	10.1
	208AR Aquatic net bag	4.40	1205	Label pins per 100	1.0
	208AT Aquatic net bag	4.40		per 500	4.2
	212AR Aquatic net bag	4.85	1201	Insect pins, size 3 100	1.3
	212AT Aquatic net bag	4.85		per 1,000	11.0
				per 10,000	100.0
5	410R Aquatic net	19.80			
	410RR Replacement net bag	8.95	1153A	Camel hair brush # 1 each	.8
	410T Aquatic net	19.80	1153B	Camel hair brush # 2 each	.9
	410TT Replacement net bag	8.95	1153C	Camel hair brush # 3 each	1.0
	412D Aquatic net	23.10			
	412DD Replacement net bag	9.50	28 1210	Blank labels, per 1,000	.8
	425 Bottom sampling dredge	86.00	1211	Blank labels, per 1,000	.8
	428 Water sampling bottle	39.00	1212	Blank labels, per 1,000	.8
			1213	Blank labels, per 1,000	.8
	1138 Collecting & mounting kit,		1214	Blank labels, per 1,000	.8
	each	20.35	1220	Blank labels, per dozen cards	.8
	dozen	223.85	1221	Blank labels, per dozen cards	.8
			1222	Blank labels, per dozen cards	.8
6	1023E Spreading board, adjustable	8.50	1223	Printed labels, per 1,000	6.6
	1023F Spreading board, adjustable	9.50			
	1023K Spreading board kit of 12	48.00			
	1023L Adjustable hardware for kit	9.00			
	each				
	dozen				
	1022A Spreading board	7.15	1224	Printed order cards	.25
	1022B Spreading board	7.15		each	2.5
	1022C Spreading board	7.15		dozen	
	1022D Spreading board	7.55	1225	Field note form, per pad	3.7
	1022E Spreading board	8.95	1151	Rapidograph pen	10.5
	1022G Spreading board	9.35	1152A	Replacement point, #000	6.5
	1024C Spreading board	4.95	1152B	Replacement point, #0000	7.5
	1024E Spreading board	6.30	1153	India ink	1.5
	1157 Repair adhesive	1.60		each	dozen
	1146 Pin holder	2.20	1150A	Label pen & point	.65
			1150B	Replacement point	.35
7	1144 Pinning block	.75	8.25		
	1145 Pinning block	1.25	13.75	29 1196	Vapona fumigant strip 2.75
	1159 Polyporous strips	3.50		1182	Chlorocresol 50 grams ^a
	1161A Point punch, round	26.50			100 grams ^a
	1161B Point punch, square	26.50			200 grams ^a
	1147 Pin holder	5.50		1182A	Styrene box
					each
					dozen

*Price applies to one size only per 1,000. Please specify sizes of pins when ordering.

Note: 1. Minimum purchase requirement does not apply to 1223 printed labels.
2. Additional charge of \$1.00 per 1,000 labels will be made if accent marks are required.

^a Price includes metal container surcharge

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Cat No	Description	Price	Cat No	Description	Price
1183	Ethyl alcohol	pint 1.75 quart 2.60 gallon 7.90	4200	Havanant trap	9.75
1185	Ethyl acetate	2 oz. bottle .95 pint 2.40 quart 4.05 gallon 11.60	4201	Havanant trap	16.00
1167	Isopropyl alcohol	pint 2.90 quart 4.80 gallon 15.40	4202	Havanant trap	27.00
1189	KAAD larval fixative	2 oz. 1.40 pint 4.40 quart 7.10	4310A	Folding trap	9.70
1190	Naphthalene flakes	1 lb. 2.75 4 1/2 lb. 10.00	4310B	Folding trap	11.25
1191	Naphthalene cones	2 dozen 3.25 gross 17.10	32	Price specify choice of colors when ordering. Price do not include boxes	
1192	Paradichlorobenzene	1 lb. 2.40 5 lb. 9.00	8515M	Vial & slide cabinet	280.00
1194	Silica gel	1 lb. 7.60 5 lb. 34.00	8515F	Vial & slide cabinet	270.00
	*Price includes metal container surcharge		8510	Vial & slide drawer	14.50
1196A	Fumigator	4.80	33	85A Vial tray	1.55
1146	Fumigant box	.40	85B	Vial tray	1.15
1149	Fumigant holder	2.50	85C	Vial tray	1.10
1226	Fragile labels, pad	1.95	85D	Vial tray	.55
		each dozen	85F	Slide tray	2.50
			8520	Vial rack	each 6.00 dozen 66.00 gross 726.00 per 100 1000
1196A	Fumigator	4.80	1133C	Genitalia vials, plastic	7.95
1146	Fumigant box	.40	1133K	Genitalia vials, glass	23.65
1149	Fumigant holder	2.50			
1226	Fragile labels, pad	1.95			
		each dozen			
3	1450A Collapsible cage	39.00 429.00	34	862 1/2 Shell vials & corks	1.10 12.10
	1450B Collapsible cage	50.00 550.00		8641 Shell vials & corks	1.25 13.75
	1450C Collapsible cage	67.00 957.00		8652 Shell vials & corks	1.60 17.60
	1450D Collapsible cage	96.00 1056.00		8674 Shell vials & corks	1.80 19.80
	1450E Collapsible cage	56.00 616.00		8696 Shell vials & corks	2.70 29.70
	1452A Collapsible cage	33.00 363.00		8608 Shell vials & corks	3.15 34.65
	1452B Collapsible cage	41.00 451.00		870 1/2 Patent lip vials & corks	1.50 16.50
	1452C Collapsible cage	58.00 639.00		8721 Patent lip vials & corks	1.60 17.60
	1452D Collapsible cage	67.00 737.00		8732 Patent lip vials & corks	1.70 18.70
	1425 Mosquito breeder	7.70 84.70		8743 Patent lip vials & corks	1.95 21.45
	1430A Cryolizers, set of 2	21.00		8754 Patent lip vials & corks	2.20 24.20
	1430B Growth chambers	5.00 55.00		890 1/2 Screw cap vials/caps	1.75 19.25
		each dozen gross		8801 Screw cap vials/caps	1.80 19.80
				8801P Screw cap vials/caps	2.10 23.10
11	1406A Outdoor cage	109.00		8802 Screw cap vials/caps	2.00 22.00
	1406B Outdoor cage	119.00		8902P Screw cap vials/caps	2.40 26.40
	1406C Outdoor cage	177.00		8804 Screw cap vials/caps	2.55 28.05
	1412A Outdoor cage	174.00		8804P Screw cap vials/caps	2.90 31.90
	1412B Outdoor cage	192.00		8806 Screw cap vials/caps	3.10 34.10
	1412C Outdoor cage	208.00		8806P Screw cap vials/caps	3.50 38.50
	1424A Outdoor cage	394.00		8808 Screw cap vials/caps	3.50 38.50
	1424B Outdoor cage	432.00		8808P Screw cap vials/caps	3.95 43.45
	1424C Outdoor cage	677.00			
	1406F Cage frame	37.00			

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Catalog Page	Cat. No.	Description	Price	Catalog Page	Cat. No.	Description	Price
			dozen				gross
35	8761	Patent lip vials only	1.30	37	6350	Microscope slides, 1/2" gross	14.30
	8762	Patent lip vials only	1.40			1 gross	15.40
	8763	Patent lip vials only	1.55		6351	Microscope slides, 1/2" gross	17.05
	8764	Patent lip vials only	1.75			1 gross	19.25
	8000	Corks, size 0	.35		6341A	Cover glass, 1/2" ounce	3.95
	8002	Corks, size 2	.40			1 ounce	4.40
	8003	Corks, size 3	.45		6341B	Cover glass, 1/2" ounce	4.95
	8004	Corks, size 4	.55			1 ounce	6.05
	8005	Corks, size 5	.65				7.15
	8007	Corks, size 7	.85	38	8530A	Sorting tray	9.35
	8009	Corks, size 9	1.20		8530B	Sorting tray	13.20
	8010	Corks, size 10	1.60		8530C	Sorting tray	17.60
	8430	Neoprene stoppers 000	.85				9.35
	8420	Neoprene stoppers 00	1.40		8909	Plastic tubes	15.40
	8410	Neoprene stoppers 0	2.15		8912	Plastic tubes	23.65
	8432	Neoprene stoppers 2	2.75		8915	Plastic tubes	30.25
	8433	Neoprene stoppers 3	3.40		8940	Plastic tubes	37.40
	8434	Neoprene stoppers 4	3.95				43.45
	1128B	Coddington magnifier 10x	19.00		4800	Handle, for use with all tips	each
	1128C	Coddington magnifier 20x	20.00		4801	Tip, needle point	9.00
	1128D	Coddington magnifier 14x	20.00		4807	Tip, hook	13.00
	1128E	Hastings magnifier 10x	30.00		4808	Tip, root knife	22.00
	1128H	Folding magnifier 5x	6.15		4812	Tip, probe	20.00
	1128K	Magnifier 10x, w/o batteries	21.00		4818	Tip, hook	19.00
	1128M	Watchmaker's loupe 8x, 18x	16.00		4828	Mini-scale	22.00
	1128N	Watchmaker's loupe 4x, 7x	12.80		4830	Tinipol kit	31.00
			each		1163	Vernier caliper	22.00
	1129A	Magnifier 10x	3.25		1164	Vernier caliper	6.00
	1129B	Magnifier 16x	6.75				24.00
	1129D	Triplet magnifier 10x	20.50				
	1129L	Magnalite 5x, w/ batt.	5.25	39	4524	Forceps	7.25
			each		4525	Forceps	7.50
			dozen		4527	Forceps	9.00
36	FM31	Field microscope	265.00		4713	Scissors	3.65
	M19T	Stereo microscope 20x	150.00		4720	Scalpel	1.90
	MA750	Widefield eyepieces 10x	34.00		4720A	Scalpel blade	.45
	M20T	Stereo microscope 30x	150.00		4720B	Scalpel blade	.45
	6393	Light scope 30x	25.00		4720C	Scalpel blade	.45
					4730	Forceps	6.55
37	6100	Microscope slide box	5.30		4731	Forceps	1.90
			58.30		4732	Forceps	2.10
	6166	Microscope stage	15.25		4734	Forceps	1.90
	6188	Microscope stage	20.50		4735	Forceps	2.10
	6370	Microslide medium, 2 oz. dropper bottle	1.50		4739	Forceps	6.50
	6375	Portable balance	75.00		4742	Forceps	2.45
	6360	Slide ringer	27.50		4744	Forceps	14.50
					4747	Forceps	2.45
					4750	Forceps	1.55
					4751	Teasing needle	.25
					4752	Teasing needle	.25
					4775	Dropping pipette	.25

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Item No.	Cat. No.	Description	Price each	Catalog Page	Cat. No.	Description	Price each
-0	3712S	Herbarium cabinet, steel	325.00	44	5046	Paleo-geology cabinet, steel	605.00
	3712F	Herbarium cabinet, plastic laminate	325.00		5046A	Specify choice of exterior color Paleo-geology tray	15.95
		*Specify choice of exterior color or finish					
	3114	Mini plant press	each 3.75 dozen 41.25		45	The Moths of America North of Mexico	
-1	3626	Herbarium cabinet, steel	490.00		9601	Fascicle 6.1, Cosmopterigidae	48.00
	3120	Host plant press	each 9.35 dozen 102.85		9602	Fascicle 6.2, Oecophoridae	59.00
	3124	Driers	1.20	9.00	9610	Fascicle 13.1A, Part 1, Scopariinae & Nymphulinae	22.00
	3129	Ventilators	1.55	11.65	9611	Fascicle 13.1B, Part 2, Odontiinae & Glaphryiinae	22.00
-2	3115	Plant press	each 151.80 dozen 217.80		9612	Fascicle 13.1C, Part 3, Evergestinae & plates to Parts 1, 2, 3	44.00
	3118	Plant press	each 86.50 dozen 1028.00		9613	Fascicle 13.2A, Part 1, Pyraustinae: Pyraustini	35.00
	3125	Standard driers	2.05	15.60	9614	Fascicle 13.2B, Part 2, Pyraustinae: Pyraustini	38.00
	3126	Heavy duty driers	5.00	37.50	9620	Fascicle 20.1, Bombycoidea	33.00
	3127	Standard ventilators	2.85	21.40	9621	Fascicle 20.2A, Citheroniinae & Heileucinae	38.00
	3128	Plastic ventilators	not available		9622	Fascicle 20.2B, Hemileucinae & Saturniinae	38.00
	3115F	Plant press frames	13.50	148.50	9630	Fascicle 21, Sphingoidea	25.00
	3170	Strap, spring buckle	3.40	37.40	9640	Fascicle 22.2, Lymantriidae	48.00
	3171	Strap, spring buckle	3.75	41.25	46	9003 How to Know the Beetles	10.95
	3172	Strap, slide buckle	2.65	29.15	9004	How to Know the Butterflies	7.95
	3173	Strap, slide buckle	3.00	33.00	9005	How to Know the Insects	10.95
3	3117	Student plant press	each 13.75 dozen 151.25		9008	How to Know the Spiders	9.95
	3130	Genus covers	2.50	18.75	9011	How to Know the Immature Insects	8.95
	3135	Mounting cards	1.70	12.75	9016	How to Know the True Bugs	9.95
	3137	Rag mounting cards	2.40	18.00	9017	How to Know the Aquatic Insects	9.95
	3210A	Fragment folders	5.60	50.40	9028	Aquatic Diptera, hardcover ed.	18.00
	3210B	Fragment folders	6.70	60.30	9034	The Moth Book	7.95
	3210C	Fragment folders	12.00	108.00	9033	Moths & How to Rear Them	5.00
	3169	Specimen data labels, per pad	1.85		9770	Noctuidae of North America	21.00
		2 oz. 2.00	18.00		9032	Common Spiders of the U.S.	3.50
	3140	Botany paste	1.10	6.50	9084	Whitefly of the World	39.75
		per 25	12.00		9046	Natural History of Flies	2.50
	4110	Bait stations	18.75	67.50	9044	Natural History of Mosquitos	9.95
					47	9059 Introduction to Aquatic Insects of N.A.	25.00
4	44175	Vertebrate skin cabinet, steel	420.00		9082	Fresh-water Invert. of U.S.	32.50
		Available with gray, office green or tan finish at additional cost when requested.			9043	Corixidae of West. Hemisph.	26.00
	4417A	Skin tray	17.50		9762	Biology & Identification of Larvae of Chironomidae	3.50
	4417B	Unit tray	each .45 per 100 40.50				

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Cat. No.	Cat. No.	Description	Price	Cat. No.	Cat. No.	Description
47	9752	Butterflies of Malay Peninsula	47.00	49	9035	Dictionary of Entomology
	9753	Butterflies of W. Malaysia & Singapore	55.00		9049	Glossary of Entomology
	9755	Butterflies of the Australian Region	120.00		9061	How to Preserve Animal Specimens in Plastic
	9750	Jamaica & Its Butterflies	40.00		9007	Writing Scientific Papers
	9757	Butterflies of So. Africa	112.00		9760	Systema Naturae
	9056	Butterflies of the World, out of print		50	9196	Vegetation & Flora of Sonoran Desert, 2 vol.
	9057	Butterflies of No. America	39.95		9198	Desert Wild Flowers
	9054	Swallowtail Butterflies of North America	6.95		9160	Flora of Southern Calif.
	9045	Mosquitoes of No. America	45.00		9060	How to Embed Flowers
	9083	Larvae of No. America Caddisfly Genera	35.00		9116	All About Weeds
					9118	Common Weeds of the U.S.
					9126	The Carnivorous Plants
48	9001	Introduction to Insects	26.25			Illustrated Flora of the Pacific States
	9068	How Insects Live	8.50		9191	Ferns to Birthworts, Vol. I
	9022	The Insects	25.00		9192	Buckwheats to Kramerias, Vol. II
	9019	Field Guide to Insects of America North of Mexico	11.95		9193	Geraniums to Figworts, Vol. III
	9040	Labelling & Storing an Insect Collection	each 1.25 dozen 13.75		9194	Bignonias to Sun Flowers, Vol. IV
	9038	How to Make an Insect Collection	each .60 dozen 6.60		9158	Calif. Flora & Supplement
	9051	Urban Entomology	34.50		9130	Marine Botany
	9080	Introduction to Insect Pest Management	32.00		9121	Manual of Grasses, 2 vol.
	9075	Fishing with Natural Insects	6.00	51	9009	How to Know the Trees
	9041	Butterflies in my Stomach	8.95		9010	How to Know the West. Trees
	9042	Entertaining with Insects	4.95		9012	Plant Families, How to Know Them
	9768	Why Not Eat Insects	3.00		9013	How to Know the Grasses
	9053	Butterflies of So. Calif.	5.25		9107	How to Know Freshwater Algae
	9072	Insects of Los Angeles Basin	7.00		9109	How to Know Mosses & Liverworts
	9070	Butterflies of Orange Co., CA	4.25		9110	How to Know the Lichens
	9052	California Insects, paperbound	7.95		9140	Medical Botany
		hardbound	16.50		9142	American Medicinal Plants
49	9067	Thesaurus of Entomology	9.00		9143	Sturtevant's Edible Plants
	9069	Common Names of Insects & Related Organisms	out of print		9020	Common Edible & Useful Plants of the West
	9026	Semiaquatic & Aquatic Hemiptera of Calif.	out of print		9111	How to Know the Wild Flowers
	9050	Aquatic Insects of Calif.	29.00		9113	Wild Flowers of the Pac. Coast
	9764	Scabies	5.00		9101	Manual of Trees of North America, 2 vol.
	9151	Composition of Sci. Words	15.50		9106	Trees of Eastern, Central U.S. & Canada
	9063	Naturalists' Directory	12.95			
	9065	Source-book of Biol. Names	15.00			
	9066	Scientists Must Write	9.95			

Recent Book Additions:
 9006 How to Know Mites & Ticks
 9089 Mosquitoes of California
 9088 Taxonomists Glossary of mosquito anatomy

Appendix C
PHOTOGRAPH OF EFFECT OF APPLICATION
OF SMC MATERIAL

