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

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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

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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 0,0, dimethyl 0-(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.

Appendix A

CORRESPONDENCE ON CUERPO DE PAZ

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

Nos agrada la confianza que ha tenido 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 suministra 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 incluído 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 órden 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 LARA/Director
CUERPO DE PAZ-Honduras

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Appendix B

CATALOG OF BIOQUIP PRODUCTS
(July 1981)

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BioQuip® PRODUCTS SINCE 1947
DIVISION OF BIO METAL ASSOCIATES
AN EQUAL OPPORTUNITY EMPLOYER

PRICE LIST

P.O. Box 61, SANTA MONICA, CA 90406
Telephone: (213) 322-6636
Telex: 19-4561 LSA
Cable: BIOQUIP

JULY 1981

THIS PRICE LIST SUPERSEDES ALL PREVIOUS PRICE LISTS

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

Catalog Page	Cat. No.	Description	Price each	Price dozen
2	1001	Insect box	9.15	100.65
	1004	Insect box	18.50	203.50
	1007	Insect box	5.80	63.80
	1002C	Insect box		26.95
	1002F	Insect box		36.60
3	1009	Insect box	5.45	59.95
	1041A	Display case	17.00	
	1041AU	Display case, unfin.	15.50	
	1041B	Display case	21.50	
	1041BU	Display case, unfin.	20.00	
*	1041C	Display case	27.25	
*	1041CU	Display case, unfin.	25.25	
*	Carton	charge for 1 or 2 1041C/CU display case(s) 2.85		
	1042H	Display case	7.30	80.30
	1042J	Display case	10.75	118.25
	1043B	Riker mount	1.95	21.45
	1043C	Riker mount	2.25	24.75
	1043D	Riker mount	2.85	31.35
	1043E	Riker mount	3.70	40.70
	1043F	Riker mount	6.05	66.55
	1043G	Riker mount	12.75	140.25

4 California Academy drawers

Cat. No.	Bottom	Hooks	Price per unit 1	12	144
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

Cat. No.	Description	Price 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

Cat. No.	Description	Price
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

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

6 Cornell drawers and trays

Cat. No.	Bottom	Hooks	Price per unit 1	12	144
1012AM	hardboard	-	23.00	22.00	21.00
1012AF	polyethylene	-	25.50	24.50	23.50
1012T	hardboard	-	17.25	16.50	15.75
1013T	hardboard	-	20.75	20.00	19.25

Catalog Page	Cat. No.	Description	Hooks	Price 1	12	144
7	1013AF	polyethylene	4	34.50	33.50	32.50
	1013C	hardboard	-	28.00	27.00	26.00
	1013CH	hardboard	4	30.00	29.00	28.00

		Price per unit 1	144	576
1025AMT	Empty unit tray	.30	.29	.28
1025AV	Tray with grid	1.10	1.05	1.00
1025KMT	Empty unit tray	.27	.26	.25

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

Cat. No.	Description	Price
2512S	Cabinet, steel, for 12 Cornell drawers or trays	260.00
2512F	Cabinet, plastic laminate, for 12 Cornell drawers or trays	260.00
2525S	Cabinet, steel, for 25 Cornell drawers or trays	455.00
2525F	Cabinet, plastic laminate, for 25 Cornell drawers or trays	455.00
2514S	Cabinet, steel, for 14 California Academy drawers	265.00
2514F	Cabinet, plastic laminate, for 14 California Academy drawers	265.00

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

Cat. No.	Description	Price
2106F	Cabinet, plastic laminate, for 6 Cornell drawers or trays	170.00
2107F	Cabinet, plastic laminate, for 7 California Academy drawers	170.00

Catalog Page	Cat. No.	Description	Price
10	2412KD	Cornell cabinet kit	170.00
	2414KD	Calif. Academy cabinet kit	172.00

12

Catalog Page	Cat. No.	Description	Price
11	1010B	Calif. Academy 6 drawer kit, comp.pinning bottoms	53.00
	1010BM	Calif. Academy 6 drawer kit, hardboard bottoms	53.00
	1012B	Cornell Univ. 6 drawer kit, comp. pinning bottoms	53.00
	1012BM	Cornell Univ. 6 drawer kit, hardboard bottoms	53.00
	1028N	Foam sheets, 16 x 18" each	2.25
		carton of 2 dozen	48.60
		Special cut sizes, minimum 10 pcs. each size, per sq. foot or fraction thereof	1.65
	1029A	Chromecoat paper sheets, doz.	6.25
	1029B	Studio paste quart	2.40

			1	Price each 144	576
12	1025AA	Unit trays	1.65	1.60	1.55
	1025A	Unit trays	.73	.71	.69
	1025B	Unit trays	.58	.57	.56
	1025C	Unit trays	.53	.52	.51
	1025D	Unit trays	.50	.49	.48
	1025E	Unit trays	.45	.44	.43
	1025J	Unit trays	.72	.70	.68
	1025K	Unit trays	.57	.56	.55
	1025L	Unit trays	.50	.49	.48
	1025V	Unit trays	.75	.73	.71
	1025W	Unit trays	.65	.64	.63
	1025X	Unit trays	.54	.53	.52
	1025Y	Unit trays	.51	.50	.49

			each
13	1026AK	Unit tray kit of 12	6.85
	1026BK	Unit tray kit of 12	5.75
	1026CK	Unit tray kit of 12	5.10
	1026DK	Unit tray kit of 12	5.00

			Per 100	Per 1,000
	1026A	Folding unit trays	23.75	213.75
	1026B	Folding unit trays	23.75	213.75
	1026C	Folding unit trays	23.75	213.75
	1026D	Folding unit trays	23.75	213.75
	1027A	Foam pinning bottoms	28.50	256.50
	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
	1027H	Applicator brush each		.20
		dozen		2.00

Catalog Page	Cat. No.	Description		Price
13	1025BX	Unit tray shipper	dozen	14.00
	1030	Pro tem block	each	1.05
			dozen	11.55
				each
14	2805	DC collecting light		33.50
	2806	AC collecting light		30.00
	2807A	Replacement tube, 15 watt		7.30
	2807B	Replacement tube, 8 watt		7.40
	2807M	Replacement mesh sleeve		.55
	2815	Pigtail adapter		6.75
	2808A	Battery		10.50
	2814	Battery adapter		5.55
15	2862	Power pack		76.50
	2862B	Replacement battery		49.00
	2862A	DC jump cord		6.50
	2811	Mini voltage converter		14.40
	2861	Power pack		110.00
	2861A	Replacement battery		50.85
	2810	Power converter, 12v		53.50
			each	dozen
16	2802A	EVS mosquito trap	65.00	715.00
	2802E	Replacement catch bag	2.70	29.70
	2802F	Replacement motor	1.50	16.50
	2802G	Replacement lamp	1.50	16.50
	2802H	D cell battery	.70	7.70
	2802K	Replacement propeller	1.05	11.55
	2802J	Chicken can	9.70	106.70
				each
17	2850A	Garbage can		10.50
	2850B	3-way cord		4.65
	2850C	Funnel		23.75
	2850D	Light, ballast, cord, AC, 120v, 8w		31.00
	2850E	Vanes, set of 3		23.50
	2850F	Rain drain		5.40
	2850J	Mesh collecting bag		3.80
	2850K	Light, ballast, cord, DC, 12v, 8w		34.50
	2807B	Replacement tube, 8 watt		7.40
	2809	Mercury vapor lamp		98.75
	2809A	Replacement lamp, 100w		24.00
18	2875A	Malaise trap with head		181.00
	2875B	Malaise trap with head		247.00
	2875D	Malaise trap with head		198.00
	2875H	Collecting head		42.00
	2875K	Malaise trap carry case		16.50

Catalog Page	Cat. No.	Description	Price	
				each
9	1139	Altimeter		17.50
	1141	Pedometer		17.95
	1125	Shovel		6.00
	1126	Field collecting bag		12.50
	2844	Head lantern		16.00
			per 100	per 1,000
	1130A	Glassine envelopes	1.20	10.80
	1130B	Glassine envelopes	1.30	11.70
	1130C	Glassine envelopes	1.50	13.50
	1130D	Odonata envelopes	3.50	31.50
			dozen	gross
	1122A	Specimen containers	1.55	17.05
	1122B	Specimen containers	1.75	19.25
	1122C	Specimen containers	2.40	26.40
	1122D	Specimen containers	2.90	31.90
			each	dozen
0	1120A	Killing jar	1.65	18.15
	1120B	Killing jar	1.90	20.90
	1120C	Killing jar	2.20	24.20
	1120Y	Extra cartridge	.75	8.25
	1120P	Pocket killing jar	1.55	17.05
	1120PY	Extra cartridge	.65	7.15
	1121A	Killing jar	1.15	12.65
	1121B	Killing jar	1.30	14.30
	1131	Dipper	3.25	
	1131H	Extendable handle	4.15	
1	1135A	Aspirator	5.20	57.20
	1135B	Aspirator	11.00	
	1135BJ	Aspirator jar & lid	.45	4.95
				each
	1135C	Aspirator		16.50
	2840	Beating sheet		10.25
	2830	Berlese funnel		54.50
	2870	Tangle trap adhesive	tube	2.90
			can	7.50
				each
2	312NA	Insect net, aerial		13.50
	312CM	Net, heavy duty aerial		14.30
	312MS	Net, medium sweep		14.05
	312HS	Net, heavy duty sweep		15.85
	315NA	Insect net, aerial		14.30
	315CM	Net, heavy duty aerial		15.30
	315MS	Net, medium sweep		14.90
	315HS	Net, heavy duty sweep, see 625HS listed elsewhere on page		
	318NA	Insect net, aerial		15.30
	325NA	Insect net, aerial		22.00
	328NA	Insect net, aerial		23.00

Catalog Page	Cat. No.	Description	Price each	Price dozen
22	612NA	Insect net, aerial	7.15	78.65
	612CM	Net, heavy duty aerial	8.00	88.00
	612MS	Net, medium sweep	7.70	84.70
	612HS	Net, heavy duty	9.00	99.00
	615NA	Insect net, aerial	7.70	84.70
	615CM	Net, heavy duty aerial	8.70	95.70
	615MS	Net, medium sweep	8.30	91.30
	625HS	Net, heavy duty sweep	11.50	126.50
	112NA	Student net	6.30	69.30
	112NAA	Replacement net bag	3.60	39.60
	112CP	Pocket net	8.00	88.00
	112CPA	Replacement net bag	3.60	39.60
				each
23	212NA	Aerial net bag		3.90
	215NA	Aerial net bag		4.35
	218NA	Aerial net bag		4.95
	212FA	Special aerial net bag		6.05
	215FA	Special aerial net bag		6.75
	212CM	Heavy duty aerial net bag		4.75
	215CM	Heavy duty aerial net bag		5.35
	212MS	Medium sweep net bag		4.45
	215MS	Medium sweep net bag		4.95
	212HS	Heavy duty sweep net bag		5.80
	215HS	Heavy duty sweep net bag		6.60
	350A	Net ring, round		2.45
	350B	Net ring, triangular		2.75
	351A	Net ring, round		2.45
	351B	Net ring, triangular		2.75
	352	Net ring, round		2.85
	353	Net ring, round		3.25
	355	Slotted lock screw		.35
	356	Cap screw & Allen key		.95
	357	Plastic grip		.55
				per linear yard
	250A	White polyester netting		1.45
	250B	Olive drab nylon netting		2.10
	250C	Off-white nylon chiffon		3.20
	250E	Unbleached muslin		1.55
	250K	Tan Lumite Saran, 20 x 20		8.00
	250L	Tan Lumite Saran, 52 x 52		19.80
				each
24	324	Tropics net, complete		57.75
	218NA	Extra net bag		4.95
	324A	Top segment		7.95
	324B	Middle segment		8.10
	324C	Bottom segment		7.40

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Catalog Page	Cat. No.	Description	Price
			each
24	436	Screen barrier net	26.95
	322AG	Gambusia net	24.50
	212AG	Gambusia net bag	7.40
	338AR	Aquatic net	14.40
	338AT	Aquatic net	14.70
	332AR	Aquatic net	14.85
	332AT	Aquatic net	15.15
	358AR	Aquatic net	21.50
	358AT	Aquatic net	21.80
	352AR	Aquatic net	21.95
	352AT	Aquatic net	22.25
	208AR	Aquatic net bag	4.40
	208AT	Aquatic net bag	4.40
	212AR	Aquatic net bag	4.85
	212AT	Aquatic net bag	4.85
25	410R	Aquatic net	19.80
	410RR	Replacement net bag	8.95
	410T	Aquatic net	19.80
	410TT	Replacement net bag	8.95
	412D	Aquatic net	23.10
	412DD	Replacement net bag	9.50
	425	Bottom sampling dredge	86.00
	428	Water sampling bottle	39.00
	1138	Collecting & mounting kit, each	20.35
		dozen	223.85
			each
26	1023E	Spreading board, adjustable	8.50
	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	78.65
	1022B	Spreading board	7.15	78.65
	1022C	Spreading board	7.15	78.65
	1022D	Spreading board	7.55	83.05
	1022E	Spreading board	8.95	98.45
	1022G	Spreading board	9.35	102.85
	1024C	Spreading board	4.95	54.45
	1024E	Spreading board	6.30	69.30
	1157	Repair adhesive	1.60	
	1146	Pin holder	2.20	
27	1144	Pinning block	.75	8.25
	1145	Pinning block	1.25	13.75
	1159	Polyporous strips	3.50	
	1161A	Point punch, round	26.50	
	1161B	Point punch, square	26.50	
	1147	Pin holder	5.50	

Catalog Page	Cat. No.	Description	Price
27	1202B	Insect pins, elefant 100	2.10
		per 1000*	19.00
	1202S	Insect pins, stainless 100	2.95
		per 1000*	26.50

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

	1204B	Minutens, black per 500	5.10
		per 1,000	9.25
	1204S	Minutens, stainless 500	5.60
		per 1,000	10.10
	1205	Label pins per 100	1.05
		per 500	4.25
	1201	Insect pins, size 3 100	1.30
		per 1,000	11.00
		per 10,000	100.00
	1153A	Camel hair brush # 1 each	.80
	1153B	Camel hair brush # 2 each	.90
	1153C	Camel hair brush # 3 each	1.00
28	1210	Blank labels, per 1,000	.80
	1211	Blank labels, per 1,000	.80
	1212	Blank labels, per 1,000	.80
	1213	Blank labels, per 1,000	.80
	1214	Blank labels, per 1,000	.80
	1220	Blank labels, per dozen cards	.80
	1221	Blank labels, per dozen cards	.80
	1222	Blank labels, per dozen cards	.80
	1223	Printed labels, per 1,000	6.60

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.

		each	dozen
1224	Printed order cards	.25	2.50
			each
1225	Field note form, per pad		3.75
1151	Rapidograph pen		10.50
1152A	Replacement point, #000		6.50
1152B	Replacement point, #0000		7.50
1153	India ink		1.55
		each	dozen
1150A	Label pen & point	.65	7.15
1150B	Replacement point	.35	3.85
29 1196	Vapona fumigant strip	2.75	30.25
1182	Chlorocresol 50 grams*		4.00
	100 grams*		7.00
	200 grams*		13.00
1182A	Styrene box each		.55
	dozen		6.05

* Price includes metal container surcharge

Catalog Page	Cat. No.	Description		Price
3	1183	Ethyl alcohol	pint	1.75
			quart	2.60
			gallon	7.90
	1185	Ethyl acetate	2 oz.bottle	.95
			pint	2.40
			quart	4.05
			gallon	11.60
	1187	Isopropyl alcohol	pint	2.90
			quart	4.80
			gallon	15.40
	1188	KAAD larval fixative	2 oz.	1.40
			pint	4.40
			quart	7.10
	1190	Naphthalene flakes	1 lb.*	2.75
			4½ lb.*	10.00
	1191	Naphthalene cones	2 dozen*	3.25
			gross*	17.10
	1192	Paradichlorobenzene	1 lb.*	2.40
			5 lb.*	9.00
	1194	Silica gel	1 lb.*	7.60
			5 lb.*	34.00

*Price includes metal container surcharge

Catalog Page	Cat. No.	Description	each	dozen
	1196A	Fumigator		4.80
	1148	Fumigant box	.40	4.40
	1149	Fumigant holder		2.50
	1226	Fragile labels, pad	1.95	

Catalog Page	Cat. No.	Description	each	dozen
0	1450A	Collapsible cage	39.00	429.00
	1450B	Collapsible cage	50.00	550.00
	1450C	Collapsible cage	87.00	957.00
	1450D	Collapsible cage	96.00	1056.00
	1450L	Collapsible cage	56.00	616.00
	1452A	Collapsible cage	33.00	363.00
	1452B	Collapsible cage	41.00	451.00
	1452C	Collapsible cage	58.00	638.00
	1452D	Collapsible cage	67.00	737.00
	1425	Mosquito breeder	7.70	84.70
	1430A	Cryolizers, set of 2	21.00	

Catalog Page	Cat. No.	Description	dozen	gross
	1430B	Growth chambers	5.00	55.00

Catalog Page	Cat. No.	Description	each
11	1406A	Outdoor cage	109.00
	1406B	Outdoor cage	119.00
	1406C	Outdoor cage	177.00
	1412A	Outdoor cage	174.00
	1412B	Outdoor cage	192.00
	1412C	Outdoor cage	288.00
	1424A	Outdoor cage	394.00
	1424B	Outdoor cage	432.00
	1424C	Outdoor cage	677.00
	1406F	Cage frame	37.00

Catalog Page	Cat. No	Description	Price each
31	4200	Havahart trap	9.75
	4201	Havahart trap	16.00
	4202	Havahart trap	27.00

Catalog Page	Cat. No	Description	each	dozen
	4310A	Folding trap	9.70	105.70
	4310B	Folding trap	11.25	123.75

32 Please specify choice of colors when ordering. Price do not include drawers.

Catalog Page	Cat. No	Description	Price each
	8515M	Vial & slide cabinet	280.00
	8515F	Vial & slide cabinet	270.00
	8510	Vial & slide draw	14.50
33	85A	Vial tray	1.55
	85B	Vial tray	1.15
	85C	Vial tray	1.10
	85D	Vial tray	.55
	85F	Slide tray	1.50
	8520	Vial rack	each 6.00
			dozen 66.00
			gross 725.00

Catalog Page	Cat. No.	Description	per 100	per 1000
	1133C	Genitalia vials, plastic	7.95	71.55
	1133K	Genitalia vials, glass	23.65	212.85

Vials with corks or caps

Catalog Page	Cat. No	Description	dozen	gross
34	862½	Shell vials & corks	1.10	12.10
	8641	Shell vials & corks	1.25	13.75
	8652	Shell vials & corks	1.60	17.60
	8674	Shell vials & corks	1.80	19.80
	8696	Shell vials & corks	2.70	29.70
	8608	Shell vials & corks	3.15	34.65
	870½	Patent lip vials & corks	1.50	16.50
	8721	Patent lip vials & corks	1.60	17.60
	8732	Patent lip vials & corks	1.70	18.70
	8743	Patent lip vials & corks	1.95	21.45
	8754	Patent lip vials & corks	2.20	24.20
	880½	Screw cap vials/caps	1.75	19.25
	8801	Screw cap vials/caps	1.80	19.80
	8801P	Screw cap vials/caps	2.10	23.10
	8802	Screw cap vials/caps	2.00	22.00
	8802P	Screw cap vials/caps	2.40	26.40
	8804	Screw cap vials/caps	2.55	28.05
	8804P	Screw cap vials/caps	2.90	31.90
	8806	Screw cap vials/caps	3.10	34.10
	8806P	Screw cap vials/caps	3.50	38.50
	8808	Screw cap vials/caps	3.50	38.50
	8808P	Screw cap vials/caps	3.95	43.45

Catalog Page	Cat. No.	Description	Price dozen	Price gross
35	8761	Patent lip vials only	1.30	14.30
	8762	Patent lip vials only	1.40	15.40
	8763	Patent lip vials only	1.55	17.05
	8764	Patent lip vials only	1.75	19.25
	8000	Corks, size 0	.35	3.85
	8002	Corks, size 2	.40	4.40
	8003	Corks, size 3	.45	4.95
	8004	Corks, size 4	.55	6.05
	8005	Corks, size 5	.65	7.15
	8007	Corks, size 7	.85	9.35
	8009	Corks, size 9	1.20	13.20
	8010	Corks, size 10	1.60	17.60
	8430	Neoprene stoppers 000	.85	9.35
	8420	Neoprene stoppers 00	1.40	15.40
	8410	Neoprene stoppers 0	2.15	23.65
	8432	Neoprene stoppers 2	2.75	30.25
	8433	Neoprene stoppers 3	3.40	37.40
	8434	Neoprene stoppers 4	3.95	43.45
			each	
	1128B	Coddington magnifier 10x	19.00	
	1128C	Coddington magnifier 20x	20.00	
	1128D	Coddington magnifier 14x	20.00	
	1128E	Hastings magnifier 10x	30.00	
	1128H	Folding magnifier 5x	6.15	
	1128K	Magnifier 10x,w/o batteries	21.00	
	1128M	Watch maker's loupe 8x,18x	16.00	
	1128N	Watchmaker's loupe 4x, 7x	12.80	
			each	dozen
	1129A	Magnifier 10x	3.25	35.75
	1129B	Magnifier 16x	6.75	74.25
	1129D	Triplet magnifier 10x	20.50	
	1129L	Magnalite 5x, w/ batt.	5.25	
			each	dozen
36	FM31	Field microscope	285.00	
	M19T	Stereo microscope 20x	150.00	
	MA750	Widefield eyepieces 10x	34.00	
	M20T	Stereo microscope 30x	150.00	
	6393	Light scope 30x	25.00	
37	6100	Microscope slide box	5.30	58.30
	6186	Microscope stage	15.25	
	6188	Microscope stage	20.50	
	6370	Microslide medium, 2 oz. dropper bottle	1.50	
	6375	Portable balance	75.00	
	6360	Slide ringer	27.50	

Catalog Page	Cat. No.	Description	Price
37	6350	Microscope slides, ½ gross	5.40
		1 gross	9.75
	6351	Microscope slides, ½ gross	4.30
		1 gross	7.80
	6341A	Cover glass, ½ ounce	3.25
		1 ounce	5.85
	6341B	Cover glass, ½ ounce	3.25
		1 ounce	5.85
		each	dozen
38	8530A	Sorting tray	2.75	30.25
	8530B	Sorting tray	2.00	22.00
	8530C	Sorting tray	1.70	18.70
		dozen	gross
	8909	Plastic tubes	1.10	12.10
	8912	Plastic tubes	1.20	14.30
	8915	Plastic tubes	1.55	17.05
	8940	Plastic tubes	2.50	27.50
			each
	4800	Handle, for use with all tips	9.10
	4801	Tip, needle point	13.75
	4807	Tip, hook	22.50
	4808	Tip, root knife	20.00
	4812	Tip, probe	19.00
	4818	Tip, hook	22.00
	4828	Mini-scale	31.50
	4830	Tinitool kit	22.00
	1163	Vernier caliper	6.50
	1164	Vernier caliper	24.60
		each	dozen
39	4524	Forceps	7.25	79.75
	4525	Forceps	7.50	82.50
	4527	Forceps	9.00	99.00
	4713	Scissors	3.65	40.15
	4720	Scalpel	1.90	20.90
	4720A	Scalpel blade	.45	4.95
	4720B	Scalpel blade	.45	4.95
	4720C	Scalpel blade	.45	4.95
	4730	Forceps	6.55	72.05
	4731	Forceps	1.90	20.90
	4732	Forceps	2.10	23.10
	4734	Forceps	1.90	20.90
	4735	Forceps	2.10	23.10
	4739	Forceps	6.50	71.50
	4742	Forceps	2.45	26.95
	4744	Forceps	14.50	
	4747	Forceps	2.45	26.95
	4750	Forceps	1.55	17.05
	4751	Teasing needle	.25	2.75
	4752	Teasing needle	.25	2.75
	4775	Dropping pipette	.25	2.75

Catalog Page	Cat. No.	Description	Price each
40	3712S	Herbarium cabinet, steel *	325.00
	3712F	Herbarium cabinet, plastic * laminate	325.00
		*Specify choice of exterior color or finish	
	3114	Mini plant press each	3.75
		dozen	41.25
41	3626	Herbarium cabinet, steel	490.00
			each / dozen
	3120	Host plant press	9.35 / 102.85
			dozen / hundred
	3124	Driers	1.20 / 9.00
	3129	Ventilators	1.55 / 11.65
			each / dozen
42	3115	Plant press	19.80 / 217.80
	3118	Plant press	86.50
			dozen / hundred
	3125	Standard driers	2.05 / 15.60
	3126	Heavy duty driers	5.00 / 37.50
	3127	Standard ventilators	2.85 / 21.40
	3128	Plastic ventilators	not available
			set of 2 / dozen sets
	3115F	Plant press frames	13.50 / 148.50
	3170	Strap, spring buckle	3.40 / 37.40
	3171	Strap, spring buckle	3.75 / 41.25
	3172	Strap, slide buckle	2.65 / 29.15
	3173	Strap, slide buckle	3.00 / 33.00
			each / dozen
43	3117	Student plant press	13.75 / 151.25
			dozen / hundred
	3130	Genus covers	2.50 / 18.75
	3135	Mounting cards	1.70 / 12.75
	3137	Rag mounting cards	2.40 / 18.00
			per 100 / per 1,000
	3210A	Fragment folders	5.60 / 50.40
	3210B	Fragment folders	6.70 / 60.30
	3210C	Fragment folders	12.00 / 108.00
	3169	Specimen data labels, per pad	1.85
		2 oz. / pint / quart	
	3140	Botany paste 1.10	6.50 / 12.00
			per 25 / hundred
	4110	Bait stations	18.75 / 67.50
			each
44	4417S	Vertebrate skin cabinet, steel	420.00
		Available with gray, office green or tan finish at additional cost when requested.	
	4417A	Skin tray	17.50
	4417B	Unit tray each	.45
		per 100	40.50

Catalog Page	Cat. No.	Description	Price
44	5046	Paleo-geology cabinet, steel	605.00
		Specify choice of exterior color	
	5046A	Paleo-geology tray	15.95
45		The Moths of America North of Mexico	
	9601	Fascicle 6.1, Cosmopterigidae	45.00
	9602	Fascicle 6.2, Oecophoridae	55.00
	9610	Fascicle 13.1A, Part 1, Scopariinae & Nymphyliinae	22.00
	9611	Fascicle 13.1B, Part 2, Odontiinae & Glaphyriinae	22.00
	9612	Fascicle 13.1C, Part 3, Evergestinae & plates to Parts 1,2,3	[illegible]
	9613	Fascicle 13.2A, Part 1, Pyraustinae: Pyraustini	35.00
	9614	Fascicle 13.2B, Part 2, Pyraustinae; Pyraustini	35.00
	9620	Fascicle 20.1, Bombycoidea	33.00
	9621	Fascicle 20.2A, Citheroniinae & Heileucinae	35.00
	9622	Fascicle 20.2B, Hemileucinae & Saturniinae	35.00
	9630	Fascicle 21, Sphingoidea	25.00
	9640	Fascicle 22.2, Lymantriidae	45.00
46	9003	How to Know the Beetles	12.95
	9004	How to Know the Butterflies	7.95
	9005	How to Know the Insects	12.95
	9008	How to Know the Spiders	9.95
	9011	How to Know the Immature Insects	9.95
	9016	How to Know the True Bugs	9.95
	9017	How to Know the Aquatic Insects	9.95
	9028	Aquatic Diptera, hardcover ed.	15.00
	9034	The Moth Book	7.95
	9033	Moths & How to Rear Them	5.00
	9770	Noctuidae of North America	21.00
	9032	Common Spiders of the U.S.	3.50
	9084	Whitefly of the World	39.75
	9046	Natural History of Flies	2.50
	9044	Natural History of Mosquitos	9.95
47	9059	Introduction to Aquatic Insects of N.A.	25.00
	9082	Fresh-water Invert. of U.S.	32.50
	9043	Corixidae of West. Hemispn.	25.00
	9762	Biology & Identification of Larvae of Chironomidae	3.50

Best Available Document

Best Available Document

Catalog Page	Cat. No.	Description	Price
47	9752	Butterflies of Malay Peninsula	47.00
	9753	Butterflies of W. Malaysia & Singapore	55.00
	9755	Butterflies of the Australian Region	120.00
	9750	Jamaica & Its Butterflies	40.00
	9757	Butterflies of So. Africa	112.00
	9056	Butterflies of the World, out of print	
	9057	Butterflies of No. America	39.95
	9054	Swallowtail Butterflies of North America	6.95
	9045	Mosquitoes of No. America	45.00
	9083	Larvae of No. America Caodisfly Genera	35.00
48	9001	Introduction to Insects	26.25
	9068	How Insects Live	8.50
	9022	The Insects	25.00
	9019	Field Guide to Insects of America North of Mexico	11.95
	9040	Labelling & Storing an Insect Collection each	1.25
		dozen	13.75
	9038	How to Make an Insect Collection each	.60
		dozen	6.60
	9051	Urban Entomology	34.50
	9080	Introduction to Insect Pest Management	32.00
	9075	Fishing with Natural Insects	6.00
	9041	Butterflies in my Stomach	8.95
	9042	Entertaining with Insects	4.95
	9768	Why Not Eat Insects	3.00
	9053	Butterflies of So. Calif.	5.25
	9072	Insects of Los Angeles Basin	7.00
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Appendix C

PHOTOGRAPH OF EFFECT OF APPLICATION
OF SMC MATERIAL

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NTO DE
COLOMBIE