ARTICLES

MALARIA ERADICATION AND POSTAGE STAMPS

DONALD R. JOHNSON [1]

Malaria eradication activities presently are being conducted in approximately 80 countries and territories of the world. This global program which is the most dramatic public health campaign in history, is being accomplished primarily through control of adult anopheline mosquitoes, utilizing DDT and other residual type insecticides applied inside the houses one to three times per year.

The following data prepared by the World Health Organization (Anon. 1960) summarize the present status of the worldwide malaria eradication program and indicate the magnitude of this tremendous operation (Table 1).

TABLE 1.—Status of malaria eradication, October 1960

World total population	2,872,377,000
Malaria free areas [2]	870,711,000
No data available	668,722,000
Original malarious areas	1,335,944,000
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Malaria eradicated	298,012,000
With eradication program	612,623,000
With survey and pilot projects	169,928,000
No program started	255,381,000
Total (original malarious areas)	1,335,944,000

[2] Malaria was not indigenous in these areas or disappeared without specific anti-malaria measures being taken.

Since their inception, the malaria control, and later the malaria eradication programs, have been popular with literally hundreds of millions of persons in both hemispheres on both sides of the Equator (Fritz and Johnson). Governments have given high priority to continuation of the campaigns. The popularity of anti-malarial operations has been and is being reflected in the issuance of postage stamps depicting various aspects of these programs.[2a] The Mexican Government issued a blue one centavo stamp (Figure 1) in 1939 which was obligatory on all mail, the money raised through its sale being used to aid in malaria control activities (Harmer and Costales.) [3] The Mexican stamp which portrays a man on his knees with a monstrous mosquito on his back, symbolizes the heavy burden mankind has borne because of malaria. By coincidence, it was in Mexico in 1955, that the Eighth World Health Assembly passed a resolution calling for malaria eradication throughout the world. The Government of Mexico jointly with the Pan American Health Organization and the United Nations' Children's Fund (UNICEF) since that time has implemented one of the most outstanding malaria eradication programs in the world. The entire 35 million population of Mexico is now protected by the active malaria eradication program and insecticide spraying operations are being systematically withdrawn from formerly malarious areas when the danger of malaria transmission has passed.

In 1955, the Government of India issued a six anna stamp (Figure 2) as previously reported by Johnson. At that time the program in India, as in Mexico and most

[1] Entomologist and Assistant Chief, Malaria Eradication Branch, Office of Public Health, International Cooperation Administration, Washington, D. C.

[2a] I wish to acknowledge with thanks the assistance kindly given by John J. Hanlon, M.D. of Philadelphia, Pa., who provided me with certain information regarding stamps pertaining to malaria.

[3] The Government of Haiti in 1949 issued a series of six postage stamps, the price of which included a surtax for tuberculosis and malaria control operations. A T.B. sanatorium was pictured on these stamps, along with a mosquito. Haiti presently is organizing a nation-wide eradication program.

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FIG. 1.—Mosquito attacking man. Mexico malaria control campaign stamp. 1939. FIG. 2.—Progress resulting from elimination of malaria. India malaria control stamp. 1955. FIG. 3.—Grassi, pioneer malaria research worker. Commemorative stamp issued by Government of Italy in 1955. FIG. 4.—"Destroy Malaria." Indonesia series of four malaria eradication stamps. 1960. FIG. 5.—Sprayman and anopheline mosquitoes. Iran malaria eradication stamps. 1960.

other countries with malaria, was one of malaria *control*. Since then, India, which has more than 400,000,000 persons living in areas originally malarious, has reorganized its program to one of *malaria eradication*. The International Cooperation Administration (ICA) of the United States Government has provided more than $50 million to the Government of India for malaria eradication since 1957 to make this possible. The World Health Organization (WHO) also has assisted by providing technical teams to study epidemiological problems. As indicated in Table 1, the great majority of the persons throughout the world living in originally malarious areas, including the tremendous population of India, now enjoy the protection afforded by this operation.

Italy was one of the more heavily malarious countries of the World prior to World War II. It subsequently was one of the first to eradicate this disease. Italy issued a green 25 lire stamp (Figure 3) in honor of Battista Grassi in 1955, the 30th anniversary of his death. It was Ronald Ross who first demonstrated transmission of a typical malaria parasite *(Plasmodium danilewskyi)* by a mosquito *(Culex fatigans)* from infected birds to healthy birds. However, it was Grassi, a perhaps somewhat lesser known contemporary of Ross, who was the first to verify completely the life cycle of the human parasites in anophelines (Boyd, 1949). It is appropriate that the Government of Italy issued this stamp depicting not only Grassi but also an anopheline mosquito and a microscope.

Two of the countries presently conducting active malaria eradication campaigns are Indonesia and Iran. Both issued colorful postage stamps during 1960 honoring the malaria eradication campaign.

Indonesia, with a population of more than 80,000,000 persons, most of whom are or have been exposed to malaria, is carrying out an ambitious program principally on the beautiful fertile islands of Java, Madura, Sumatra and Bali. President Sukarno issued a statement on February 16, 1961, to the effect that malaria eradication was one of the main principles included in the framework of the nation's development, namely to eliminate the obstacles hindering people in their daily work and to guarantee the health of every citizen. The program is expected to encompass the entire Indonesian Archipelago during the coming decade, with the combined cooperation of the Government of Indonesia, the ICA and the WHO.

The Indonesian series of four stamps is shown in Figure 4. A first day cover was issued on Indonesia's National Malaria Eradication Day, November 12, 1960. The denominations and colors are as follows:

25 sen [4]	violet
50 sen	brown
75 sen	green
3 Rupiahs [4]	orange

[4] 100 sen = 1 Rupiah (Rp.).

Each stamp depicts a side view of a female anopheline mosquito in the normal resting position. The Indonesian words "Basmilah malaria" translated are "Destroy malaria." The words "Hari Kesehatan Sedunia—1960" mean "World Health Day—1960."

Iran, previously known as Persia, is the land of the Persepolis, one of the Seven Wonders of the Ancient World. It is now participating in the malaria eradication program, a public health wonder of the modern world. Iran is being assisted in this nation-wide effort by WHO, UNICEF and ICA. Thirteen million Iranians live in areas originally known to be malarious which are now included in the program.

The Iranian stamps, recently depicted by Hyde, are shown in Figure 5. The denominations, colors, and themes are as follows:

1 Rial—Yellow background with red X lines, black mosquito (top view) and black lettering.
2 Rials—light blue background, dark blue sprayman, black lettering.
3 Rials—green background, red X lines, and side view anopheline mosquito resting on water surface.

Countries which previously have issued postage stamps with a malaria theme oriented toward the medical aspects of malaria are listed below:

1. Algeria. 1952 series of three stamps honoring pioneer malaria research workers who carried on studies in Algeria during the 19th Century:

   25 Francs, E. Millon, pharmacology of malaria therapy.
   40 Francs, Dr. F. Maillot, malaria treatment with quinine (1834).
   50 Francs, Dr. Alphonse Laveran, discovery of malaria parasites (1881).

2. Austria. 1957 commemorative 2.40 Schillings stamp honoring Dr. J. Wagner—Jauregg, who developed fever therapy for treatment of neurosyphilis utilizing induced malaria.

3. Portugal. 1958 series of two stamps, in denominations of 1.00 and 2.50 Escudos, commemorating the Sixth International Congress of Tropical Medicine and Malaria in Lisbon.

It is anticipated that there will be a number of additional postage stamps issued during the coming year utilizing the malaria eradication theme. The Executive Board of WHO (Anon. 1961) passed a resolution in October 1960 which states as follows:

"The Executive Board,

"Considering that postage stamps devoted to the world malaria eradication programme will be a valuable contribution to the dissemination of information on and will stimulate interest in the battle against malaria,

"1. Approves the plan for the issue of malaria eradication stamps;

"2. Invites Member States to arrange for issuing postage stamps devoted to the malaria eradication programme in accordance with this plan;

"3. Expresses its hope that Member States will find it possible to give the Organization either a percentage of the proceeds from the sale of such stamps, or quantities of stamps for sale to philatelists, or make other suitable donations;

"4. Invites the Universal Postal Union to co-operate with WHO in the implementation of the proposed plan and to extend any assistance it may consider possible and advisable;

"5. Requests the Director-General to take measures to ensure the successful carrying out of the proposed plan and to inform Member States of the arrangements made; and

"6. Requests the Director-General to inform the Fourteenth World Health Assembly of this plan to report on its development regularly to the Executive Board."

The plan referred to in 1. above, is the introduction of malaria eradication stamps by member countries of the Universal Postal Union on or about April 7, 1962, World Health Day. In February, 1961, the World Health Assembly, representing 109 countries or territories, passed a resolution expressing hope that such stamps will be issued. The theme is to be "World United Against Malaria."

Individuals and organizations interested in public health campaigns in general, or more specifically in malaria eradication and mosquito control, welcome the recent issuance of these Indonesian and Iranian postage stamps. It is hoped that many nations will follow the lead of Mexico, Italy, India, Indonesia, and Iran by similarly honoring the battle against mankind's most devastating vector-borne disease. The history of this program is being recorded philatelically. When future generations eventually are freed entirely of malaria and have forgotten its heavy toll, stamp collectors at least may be cognizant that their forebears suffered terribly from this disease and marshalled their forces to carry out the first global program organized to eradicate a disease.

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STUDIES OF RESISTANCE IN *AEDES TAENIORHYNCHUS*, CHATHAM COUNTY, GEORGIA

WILLIS MATHIS [1]

In 1957, studies were initiated in Chatham County, Georgia, to obtain susceptibility levels of *Aedes taeniorhynchus* to DDT and dieldrin. Although Chatham County has an extensive acreage of salt marsh from which large broods of *A. taeniorhynchus* periodically emerge, control measures prior to 1957 were limited to occasional adulticiding at Savannah and Savannah Beach. Since 1957, fogging operations with DDT have been county-wide in extent, but the larvicidal use of chlorinated hydrocarbon pesticides is not practiced.

All tests were conducted by using a resistance kit which employs papers commercially impregnated with DDT- or dieldrin-Risella oil solution (Mathis *et al.*, 1959). The test and holding chambers consist of plastic tubes 1–¾" x 5" fitted with a screen top and a removable metal shutter as a bottom. The test chambers are lined with impregnated papers, and mosquitoes are introduced for the desired exposure period. After exposure, the test specimens are transferred to holding tubes which are lined with untreated papers, offered food, and held for 24-hour mortality counts.

Most test specimens were obtained by collecting 3rd or 4th instar larvae, or pupae, from natural breeding places and completing the rearing in the laboratory. From Cockspur Island, additional specimens were obtained by flooding soil samples in the laboratory and rearing the larvae. Limited tests were also made with field-collected females from Cockspur, Tybee # 2, and the grounds of the Technical Development Laboratories.

The first tests were made during the summer of 1957 by exposing adult females collected from the laboratory grounds to DDT-Risella oil impregnated papers. A 60-minute exposure gave 89 percent mortality and 120-minute exposure gave 98 percent. During the winter of 1957–58, adults reared from flooded soil samples from Cockspur Island and exposed to the same residues gave a much lower mortality. When exposed to dieldrin residues the mortality was even less than that obtained with DDT. It was later discovered that the Georgia Department of Agriculture and the Plant Pest Control Division of the U. S. Department of Agriculture had treated approximately 134 acres on Cockspur Island during August 1957 with 4 to 5 pounds of dieldrin per acre for the control of the white-fringed beetle.

During 1958, tests were made with adults from Cockspur Island and from four other locations 1 to 7 miles from this island. Two of the locations were southeast of this island (1 to 2 miles) and

[1] From the Technical Development Laboratories, Technology Branch, Communicable Disease Center, Bureau of State Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Savannah, Georgia.