They can be found together with *A. superpictus* in pools of mountain torrents during summer. *A. sacharovi* also breed on high land up to 1,720 meters in the Van region and it can be found in springs, lakes or drains and in breeding places next to mountain lakes. Breeding places have generally clean, still and sunny waters, with green vegetation. When they cover extensive areas and especially where there is irrigation, it is almost impossible to control the breeding of larvae.

ADULTS. In the Middle East, *A. sacharovi* feeds mostly on man and other domestic animals. It is found abundantly in stables. Following the last ten years of DDT spraying, *A. sacharovi* recently began to show a tendency to be less domestic in habits. By resting in caves in Savur in the East of the Country, in Adana Region in the South, they cause outdoor transmission. Insecticide spraying does not cause their complete disappearance, but where insecticide spraying is neglected they increase abundantly. They hibernate as adults in stables where hundreds of them may be collected. It is also possible to find a great number of *A. sacharovi* specimens in Maras region, due presumably to DDT resistance.

They are found resting on ceilings and walls of stables above one meter from the floor in half shaded places, along with *A. hyrcanus, A. superpictus,* and others. They are also found in rooms of houses, in darkish corners, inside cupboards, between objects hanging from walls, in back of and beneath furniture, and in other similar situations.

ANOPHELES DISTRIBUTION AND ITS RELATION TO THE MALARIA ERADICATION PROGRAM IN CENTRAL NEPAL

HAROLD W. BRYDON,[1] GOVIND JOSHI,[2] AND SHREEDHAR PRADHAN [3]

The high Himalayan Kingdom of Nepal is not spared the devastation of malaria (Karan and Jenkins, 1960), which for centuries has plagued, hampered and killed the Nepalese people. Starting in 1952, the United States foreign aid program, working in collaboration with the Nepalese government, undertook a small malaria control project especially to assist the people living in the hyperendemic areas. It was at this time that the first efforts were made to survey the mosquito population and discover the vectors.

The initial steps in malaria control proved most successful. As time passed, the control program steadily increased in magnitude. Then, with the intensity of malaria eradication programs increasing throughout the world, with the neighboring successful Indian eradication program progressing favorably and with a World Health Organization pilot project proving very successful in Nepal, it was felt that a Nepalese eradication program was not only feasible, but would prove more advantageous to Nepal than a control program. Therefore, in December 1958 two coordinated bilateral agreements were signed between His Majesty's Government of Nepal, the World Health Organization (WHO) and the United States International Cooperation Administration (ICA) to undertake a malaria eradication project in Nepal.

For the purposes of the eradication program, the country was divided into three zones consisting of an Eastern Zone,

[1] Entomologist Advisor, International Cooperation Administration.
[2] Chief Entomologist, Nepal Malaria Eradication Organization.
[3] Entomologist, Nepal Malaria Eradication Organization.

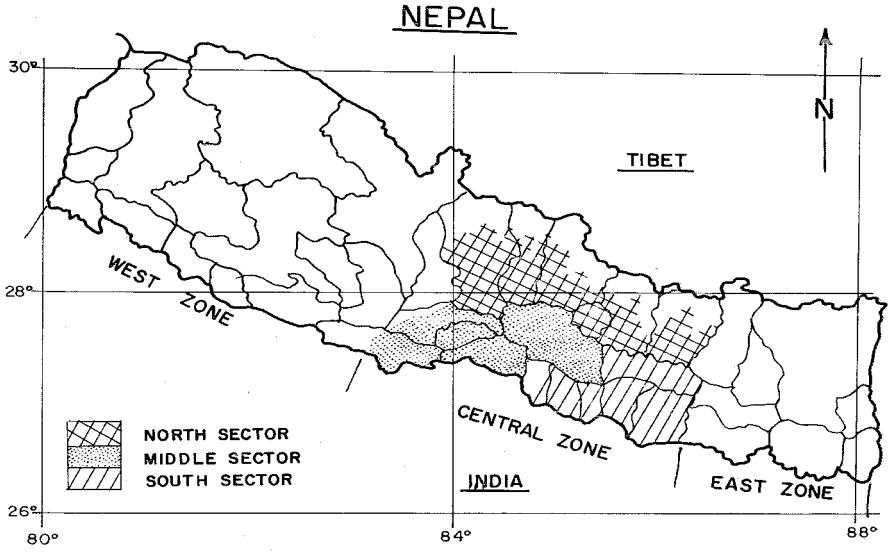

FIG. 1.—Map of Nepal, showing the zonal divisions, and the sector division of the central zone.

Central Zone and Western Zone (Figure 1). Since money and trained manpower were not sufficient to include the entire country immediately, it was decided to confine the first phase of the program to the Central Zone. This zone was then divided into three sectors which were referred to as North Sector, Middle Sector, and South Sector, and each sector was, in turn, divided into subsectors. A National Headquarters, situated in Kathmandu, was established to serve as the governing and unifying body to the organization.

The entomological data which had been accumulated during the control project and the WHO pilot project were utilized as guidelines and supportive intelligence in developing and conducting the eradication project. Both routine and random mosquito collections were conducted during the pre-eradication phase of the program as a part of the effort to obtain further pertinent eradication data. As a result of these collections, a total of thirty-one species of *Anopheles* mosquitoes have been collected in the Central Zone since the inception of the control and eradication programs. Their distribution in each of the districts of the Central Zone appears in the accompanying chart (Figure 2). Specialists with both the World Health Organization and the U. S. National Museum have on occasion furnished species confirmation on new or doubtful collections.

During the years preceding the eradication program, *Anopheles fluviatilis* and *Anopheles minimus* were incriminated as vectors of malaria. This has since been reconfirmed during the eradication program. *A. fluviatilis* is the primary vector of malaria in the hilly regions which are mostly in the North Sector (Figure 3). *A. minimus* is the primary vector and *A. fluviatilis* the secondary vector in the forested and forest fringe areas which comprise the mid-terai regions which pass predominantly through the Middle Sector. *A. minimus* is also a vector in certain parts of the South Sector; however, much of the South Sector is in the terai or

Anopheles Species	CENTRAL ZONE DISTRICTS															
	North Sector						Middle Sector				South Sector					
	West No. 1	West No. 2	West No. 3	East No. 1	East No. 2	Kathmandu	Nawalpur	Butawal	Chitawan	Chisapani Garhi	Parsa	Bara	Rautahat	Sarlahi	Sindhuli Garhi	Mahotari
aconitus			x				x	x	x	x	x	x				
aitkenii					x	x						x				
annandalei			x							x						
annularis	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
barbirostris	x			x	x	x	x	x	x	x	x	x	x			
culicifacies	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
filipinae			x													
fluviatilis	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
gigas						x				x						
hyrcanus	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
jamesii			x							x						
jeyporiensis			x	x			x		x	x	x	x	x		x	x
karwari										x						
lindesayi	x	x	x		x	x	x			x		x	x			
maculatus	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
majidi							x			x						
mangyanus															x	
minimus	x				x		x	x	x	x	x	x	x	x	x	x
pallidus			x		x			x	x	x	x		x	x		x
philippinensis							x	x				x	x	x		
ramsayi							x	x								
sinensis						x				x						
splendidus	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
stephensi										x						x
subpictus	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
tessellatus				x	x	x	x	x			x	x				
theobaldi			x							x						
turkhudi				x	x				x	x		x				
umbrosus										x						
vagus	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
varuna								x	x	x						

FIG. 2.—The different species of Anopheles which have been collected from the various Districts of the Central Zone are indicated by an "X" under the District name.

open unforested area, similar to the adjacent plain area of Northern India and neither *A. fluviatilis* nor *A. minimus* are extensively found there. *Anopheles culicifacies* is abundantly and extensively found in the open plain area of the South Sector and, even though it has so far not been incriminated in Nepal, it is a proven vector in similar adjacent areas in India (Bhatia and Krishnan, 1957 and Puri, 1955). Therefore, it has been assigned to the category of suspected vector in Nepal. As seen in Figure 3, *A. fluviatilis*, *A. minimus* and *A. culicifacies* form distinct east-west belts, which, however, overlap slightly where the density is about equal.

Since the East-West belts of terai, midterai and hilly regions extend into both the East and West Zones of Nepal, it is expected that a distribution pattern of the present predominant vector and suspected vector species will be developed which is similar to the one which has been established in the Central Zone. Perhaps new *Anopheles* species will also be found as

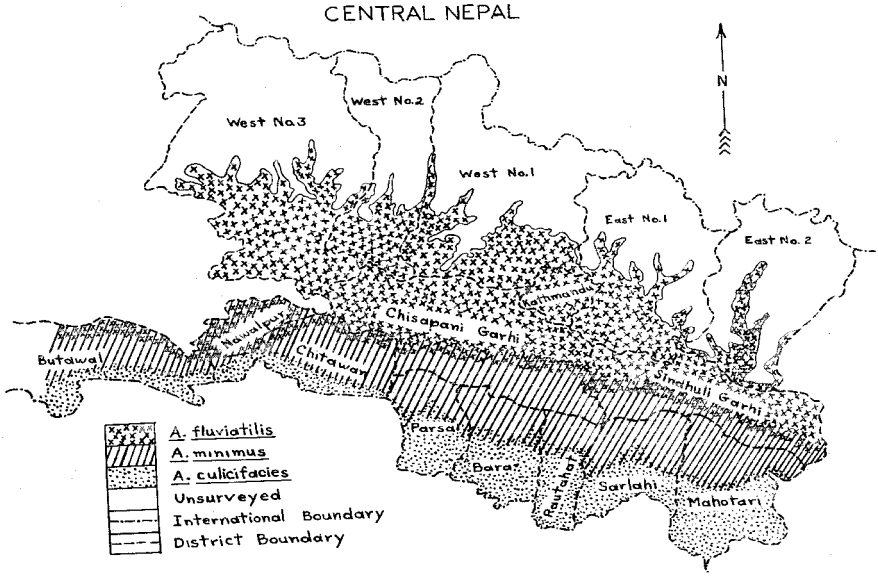

FIG. 3.—Map of the Central Zone of Nepal showing the distribution of the predominant vectors and suspected vector in each District.

new distribution records are made. In the past, many specimens of *Anopheles* species, other than the vectors and suspected vectors, have been dissected for sporozoites and even though they have not proven positive, it is conceivable that as the program progresses additional vectors of malaria will be found in Nepal.

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Watch for information on the Galveston Meeting in the September and December issues: Galveston, Texas, March 5, 6, 7, 1962. Almost anything in Texas is certain to be big and impressive, and the AMCA Meeting will be no exception.