taneous night hand catches followed by simultaneous morning 'flit' catches were recorded. In Table 2 the catches are recorded for sake of brevity as total mosquitoes, but both Anophelines and Culicines were usually more numerous at night than in the morning in the treated catching station, and showed the opposite tendency in the untreated catching station. The catching took place during July–September 1948, the last spraying with 4 per cent *p'p'* DDT in dieselene having taken place in November 1947.

Table 2

	Night		Morning		Night		Morning	
Hut A (untreated)	11		20		14		57	
Hut B (treated)	12		0		13		2	
	Night Morn.		Night Morn.		Night Morn.		Night Morn.	
Hut C (untreated)	3	7	21	29	14	8	13	16
Hut D (treated)	1	1	15	2	7	2	7	2

In addition, routine morning 'flit' catches at weekly or monthly intervals were made in eighteen untreated (new) houses in the treated area, in addition to catching at 108 treated catching stations. The 'female *funestus*-per-house' catches in the eighteen houses were greater than those from the 108 houses throughout the period recorded, which extended from May 1948, six months from last spraying, until June 1949.

It was concluded that the 'flitted' catching station technique (Table 7 of Dowling), which was developed before the use of persistent insecticides, for example by Hocking⁶, is of doubtful value when the catching stations are treated. Further investigation would appear to be needed on the interpretation of results from untreated catching stations in a treated area, and both the measurement of mosquito prevalence and malariometry await adequate statistical treatment.

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Quantitative Determination of Amino-acids Separated by Paper Partition Chromatography

DETERMINATION of individual amino-acids in a chromatographed mixture by measuring nitrogen content was discouraged by Martin and Mittelmann¹, who reported interference from the solvents used. The method has now been re-investigated. Chromatograms were prepared using Whatman No. 1 paper and the apparatus described by Datta, Dent and Harris²; the solvents were (a) *n*-butanol-acetic acid³, and (b) a mixture of phenol and water (4:1) in the presence of acetic acid. The papers were dried overnight at room temperature, then sprayed with Moore

and Stein⁴ reagent diluted with methyl alcohol to contain 0.1 gm. ninhydrin/100 ml. The colours obtained with this reagent were found to be more stable than those given by a solution of ninhydrin in *n*-butanol, and there was less vertical streaking of the spots on the paper. The papers were heated, the spots outlined with pencil and identified by comparison with a series of similarly prepared 'maps'. Demarcation of the spots is helped by the fact that adjacent spots often give slightly different colours with ninhydrin. The identified spot and a piece of paper of the same area were cut from the same sheet, the latter for a blank determination.

Each specimen was placed in a micro-Kjeldahl flask with a side-arm which could hold 3 ml., and heated for 2 min. with 0.1 N sodium hydroxide solution to remove any ammonia absorbed by the paper⁵. Digestion was carried out for 12 hr. with hot concentrated sulphuric acid containing a copper and selenium catalyst⁶. The digest was diluted to a known volume in the side-arm and the ammonium-nitrogen content of an aliquot determined by the Conway microdiffusion method, using 0.0002 N hydrochloric acid containing Tashiro's reagent as indicator.

The method was first applied to mixtures of amino-acids. The results are given in the accompanying table and show that unless the quantities of amino-acid are too large to separate well on the paper, this method of estimation is reliable.

DETERMINATION OF AMINO-ACIDS IN PREPARED MIXTURES

Amino-acids	μgm. taken	% estimated	Paper blank as % total nitrogen measured
Mixture 1. Arginine	21.3	108	18
Tyrosine	25	100	22
Tryptophan	25	128	20
Histidine	25	72	18
Mixture 2. Tryptophan	10	101	52
Histidine	10	97	56
Mixture 3. Hydroxyproline	10	109	42
Alanine	10	93	60
Lysine	10	86.5	59
Glycine	10	99	43
Aspartic acid	10	99	43

The method was also applied to a deproteinized aqueous extract of bean embryos prepared by Awapara's method⁷. It showed that when 100 μl. extract was used to prepare each of three chromatograms, the aspartic and glutamic acid contents determined on each were 7.7 μgm. aspartic acid-nitrogen and 6.8 μgm. glutamic acid-nitrogen, with exact agreement between the triplicates.

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