All 24 patients have recently been examined with highly gratifying results; 23 were found to be normal on clinical examination and no relapses were found to have occurred. One patient, a homosexual, was found to have a new infection (reinfection), four and a half years after the original treatment. This patient was first seen at Bellevue Hospital on 22 August 1951 with secondary syphilis. On 23 August 1951 he received 4.8 million units of PAM. The serological results became negative by December 1951 and remained negative until 1955. In February 1956 he was found to have early syphilis with darkfield-positive lesions. The patient admitted having bouts of exposures towards the latter part of 1955.

The serological results in these 24 patients are given in the accompanying three tables. The significance of the differences in serological patterns obtained with the treponemal tests is not quite clear as yet, and further study will be required before definite conclusions can be reached. A final report on this study will be submitted at a later date.

Cytogenetics of *Anopheles gambiae*

by M. Holstein, *WHO Entomologist, Bukavu, Belgian Congo*

The chromosomic map of *Anopheles gambiae* has been described in a previous paper,[a] which also pointed out the effects of changes in breeding temperature on the chromosomic rearrangements in two batches of the same strain.

Thanks to the kindness of Professor G. Macdonald, Director of the Ross Institute for Tropical Medicine, London,[b] I have recently been able to examine the chromosomes of the *A. gambiae* strain originating from Lagos, Nigeria (mother-strain of the one studied in Pavia) as well as the chromosomes of the dieldrin-resistant Sokoto (Northern Nigeria) strain, both maintained at the Ross Institute.

The chromosomes of the Lagos strain proved identical to the ones examined in Pavia: the bands and sequences correspond entirely to those of the map mentioned above and the same heterozygous inversions may be found without any variation, except in the percentage distribution. In Pavia, at the normal breeding temperature of 24°C (75.2°F), *gambiae* was characterized by the presence of a heterozygous inversion on sectors 39-41 of III G (in 10.6% of the specimens). This inversion was also found in London in 8.5% (9 out of 105 specimens). On only one occasion was the inversion found on II D. No inversions were present on III D, II G and X.

On the other hand, the Sokoto strain, reared under the same conditions as the Lagos strain, revealed a great number of inversions. The results were as follows:

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[a] Frizzi, G. & Holstein, M. (1956) *Bull. Wld Hlth Org.*, 15, 425

[b] I wish to express my gratitude to Miss Wall and Mr G. Davidson for their invaluable help during my stay in the Institute.

(1) on II D: terminal heterozygous on 15-16; heterozygous on half of 7 and 8-9; heterozygous on 9-11; heterozygous, double, on 12-14 and 15-16

(2) on III D: heterozygous on 29-31

(3) on III G: heterozygous on 39-41

(4) no inversions on II G and X.

Among 186 specimens, the distribution of inversions was as follows:

Chromosomes	*Sectors*	*Inversions*		*Percentage of total inversions*
		Number	*Percentage*	
II D	7-9	5	2.6	7.0
	9-11	27	14.5	37.5
	15-16	11	5.9	15.3
	12-14, 15-16	7	3.7	9.7
III D	29-31	15	8.0	20.8
III G	39-41	7	3.7	9.7
	Total . . .	72	38.4	

It is worth noticing that the polymorphism which was found in the Sokoto strain is still more accentuated than that of the Lagos strain reared in Pavia at 31° C (87.8° F). On the other hand, when the inversions 10-11 and 13-14 on II D were found again in London, they were more widespread and concerned also the sectors 9 and 12; in addition, the 12-14 inversion was always found in association with the 15-16 inversion. The subterminal inversion on III G was identical. But all the other inversions encountered in the London colony had not previously been met with.

It is very difficult indeed to state whether all or only part of these chromosomic rearrangements are a result of the dieldrin-resistant character of the strain or whether they may be considered as an indication of geographical races within the species. The time I spent in London was too short to enable me to study the Sokoto-Lagos hybrids but I feel that such an investigation would be worth while; it may prove possible, by statistical analysis, to separate inversions due to resistance, if any, from inversions due to geographical races. However, to obtain an outline for an extensive study of the genetics of resistance and of natural populations, more work has to be done. The almost complete sterility of Sokoto-Lagos hybrids (which does not seem to be a result of insecticide-resistance), the sterility that was encountered, in Tanganyika, in hybrids of geographically distant strains of *gambiae* (so far, no valid data are available, owing to the interruption of the research work), the differences in the reactions of the species towards different insecticides in various parts of the African continent, the so-called behaviouristic resistance in some areas—all these facts make credible the existence of geographical races or populations of *A. gambiae*. In other respects, the genetic mechanism of insecticide-resistance needs further investigation.

In order to check the data given so far, it would be necessary to build up, in the laboratory, *gambiae* colonies originating from geographically and climatologically different areas, and reared under standard conditions to eliminate the environmental causes of chromosomic rearrangements—*inter alia*, temperature, food, salinity. It would, of course, be most desirable to deal with strains as pure as possible. Crossing experiments would then more probably give valid information on the racial differentiations and the amount of geographical isolation within the species.

The subsequent inducing of resistance into one of these strains, followed by a study of the possible chromosomic rearrangements and of the fate of hybrids, would be yet another step forward.

Finally, the introduction of naturally resistant strains, the study of their chromosomic pattern and the carrying out of crossing experiments with other strains maintained in the laboratory would usefully complete the research programme.

This would be a very long and ambitious task, but I feel that it would be of considerable help in solving some of the problems which are a very real source of annoyance to many malariologists in charge of control projects.

The Concept of Kwashiorkor from a Public Health Point of View

by J. C. WATERLOW, M.D., *Tropical Metabolism Research Unit, Medical Research Council, Jamaica*, and NEVIN S. SCRIMSHAW, Ph.D., M.D., *Instituto de Nutrición de Centro América y Panamá (INCAP), Guatemala*

It is now generally agreed that the type of severe malnutrition in infants and young children for which the name kwashiorkor is widely used is basically the same in many parts of the world—in Africa, India, and South-East Asia, the Caribbean, Mexico, Central and South America, and Europe. Underlying many differences in terminology and regional variations in the details of the clinical picture, there is a fundamental unity. The clinical, pathological, and biochemical features of the syndrome have been very fully discussed in a number of recent publications.[a-e] However, few people have had the opportunity of studying the condition at first hand in several countries.

In the summer of 1955 a conference on human protein requirements, convened at Princeton, N.J., USA, by the Food and Agriculture Organization, the World Health Organization and the Josiah Macy Jr. Foundation,

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[a] Second Inter-African (CCTA) Conference on Nutrition (1954) *Malnutrition in African mothers, infants and young children. Report of the ... conference, Gambia, 1952*, London

[b] Trowell, H. C., Davies, J. N. P. & Dean, R. F. A. (1954) *Kwashiorkor*, London

[c] Autret, M. & Behar, M. (1954) *Síndrome policarencial infantil (kwashiorkor) and its prevention in Central America*, Rome (*FAO Nutritional Studies*, No. 13)

[d] Waterlow, J. C., ed. (1955) *Protein malnutrition. Proceedings of a conference in Jamaica, 1953 ...*, Cambridge (printed for FAO, Rome)

[e] Scrimshaw, N. S. et al. (1956) *Fed. Proc.*, 15, No. 3 (in press)