

115. Probability-theoretic Investigations on Inheritance. XV₁. Detection of Interchange of Infants.¹⁾

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1. Problem to be discussed and its basic postulate.

With increasing spread of institution of maternity hospitals, the chance of almost simultaneous deliveries at the same place will also increase. It would then be expected that two new-born infants are interchanged intentionally or accidentally. When such a case arises and even when two infants resemble indistinguishably, there can be cases where the interchange is detected by means of an inherited character.

We now take *a triple consisting of a child and its parents as a unit of consideration*. Let two such triples be presented under a suspicion of interchange of infants. If in at most one triple there is an inconsistency with respect to types, i.e., an apparent infant possesses a type not producible by parents of the triple, then the decision of interchange is possible. This fact is a basic postulate for our discussion in the present chapter.

We consider the probability of an event that the decision is possible under a supposition of actual interchange. But, as the following discussion will show, the supposition of interchange is unessential. The problem concerns rather, given two matings and their respective children, to determine the actual relationship.

2. Illustration by *MN* blood type.

We begin with the *MN* blood type as the most simple model

1) Y. Komatu, Probability-theoretic investigations on inheritance. I. Distribution of genes; II. Cross-breeding phenomena; III. Further discussions on cross-breeding; IV. Mother-child combinations; V. Brethern combinations; VI. Rate of danger in random blood transfusion; VII. Non-paternity problems; VIII. Further discussions on non-paternity; IX. Non-paternity problems concerning mother-children combinations; X. Non-paternity concerning mother-child-child combinations; XI. Absolute non-paternity; XII. Problem of paternity; XIII. Estimation of genotypes; XIV. Decision of biovular twins. Proc. Japan Acad., **27**(1951); I. 371-377; II. 378-383, 384-387; III. 459-465, 466-471, 472-477, 478-483; IV. 587-592, 593-597, 598-603, 605-610, 611-614, 615-620; V. 689-693, 694-699; **28**(1952), VI. 54-58; VII. 102-104, 105-108, 109-111, 112-115, 116-120, 121-125; VIII. 162-164, 165-168, 169-171; IX. 207-212, 213-217, 218-223, 224-229; X. 249-253, 254-258, 259-264; XI. 311-316, 317-322; XII. 359-364, 365-369; XIII. 432-437, 438-443; XIV. 444-449.