

**51. Probability-theoretic Investigations on Inheritance.**  
**IX<sub>1</sub>. Non-Paternity Concerning Mother-Children Combinations.**

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**1. Several problems to be discussed.**

The problems discussed in two preceding chapters<sup>1)</sup> have concerned exclusively the probabilities of proving non-paternity in case where a pair of a mother and her one child is presented. According to the nature of problems, the use has been made of the probability of mother-child combination obtained in §§ 1 and 2 of IV. Now, with respect to mother-children combination, there arise analogous problems which will be discussed in the present chapter. For the sake of brevity we restrict ourselves to two-children case; generalization to several children case will be left to the reader.

Various sorts of problems are now to be considered; for instance, given two children possessing a common mother, to determine a probability of proving non-paternity against a distinguished child at any rate, against a distinguished child alone, against at least one child, or against both children. Moreover, it may also be considered, for instance, to determine a probability in which the father of first child can assert the non-paternity against second child. Two cases are distinguished according to both children possessing father also in common or not; namely, to cases discussed in § 3 of IV or § 5 of IV. The last-mentioned problem concerns, of course, the latter, while the remaining problems mentioned above may concern either of cases.

In the present chapter we shall discuss the problems concerning two children belonging to the same family, i.e., possessing a father also in common. Hence, the use will be made of the results obtained

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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. Brethren combinations; VI. Rate of danger in random blood transfusion; VII. Non-Paternity problems; VIII. Further discussions on non-paternity problems. Proc. Jap. 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.; **28** (1952), VI. 54-58; VII. 102-104, 105-108, 109-111, 112-115, 116-120, 121-125; VIII. 161-164, 165-168, 169-171. These papers will be referred to as I; II; III; IV; V; VI; VII; VIII.