

83. Probability-theoretic Investigations on Inheritance. XII₁. Probability of Paternity.

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1. Problem and its background.

In several preceding chapters¹⁾ we discussed various problems on non-paternity. A typical problem concerned the case where a man in question could prove his non-paternity against a given child, based upon inherited characters under consideration. Distinction was made according to that a character of child alone, or also of its mother and its brother was known. In every problem, non-paternity proof was based upon the fact that the characters were incompatible, and hence the proof was predicative provided that the inheritance mode was so established.

On the other hand, if the cases where non-paternity proof is successful are excluded, the remaining cases cannot be predicatively decided, at least based upon the inherited character alone. In other words, if a type of a man is compatible with that of a given child, then non-paternity proof is of course impossible, but this impossibility does not necessarily mean that the paternity is affirmatively proved. However, there will arise a problem to estimate whether in such cases the paternity is or is not to a certain degree probable based on the inherited characters. In the present chapter we shall investigate such a problem. The main tool of attack is the *Bayes' theorem* referred to at the end of § 1 in IV ²⁾.

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; IX. Non-paternity problems concerning mother-children combinations; X. Non-paternity problems concerning mother-child combinations. XI. Absolute non-paternity. 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. These papers will be referred to as I; II; III; IV; V; VI; VII; VIII; IX; X; XI.

2) Such a problem has been compendiously discussed in E. Essen-Möller und C.-E. Quensel, Zur Theorie des Vaterschaftsbeweises auf Grund von Ähnlichkeitsbefunden, Deut. Zeitschr. f. ges. gerichtl. Med. **31** (1939), 70-96. Cf. also Y. Komatu, On decision of paternity based upon blood types (Japanese), Hanzai-gaku-Zasshi **13** (1939), 485-494.