

TABLE OF CONTENTS

| | |
|---|----|
| General introduction..... | 1 |
| Book I Some translation planes that are not well known | |
| 1. Introduction, Book I..... | 4 |
| 2. Preliminary results..... | 4 |
| 3. Constructions by replaceable nets..... | 8 |
| (a) The first method of choosing replaceable nets.. | 10 |
| (b) The second method..... | 10 |
| (c) The third method..... | 11 |
| (d) The first type of replacement..... | 13 |
| (e) The second type..... | 15 |
| (f) The third type..... | 17 |
| (g) The fourth type..... | 18 |
| 4. Collineations and isomorphisms..... | 21 |
| (a) Desarguesian decompositions..... | 21 |
| (b) Desarguesian decompositions and collineations of generalized Andre' planes..... | 27 |
| (c) Further results on Desarguesian decompositions and collineations..... | 37 |
| 5. Tentative classification by Desarguesian decompositions..... | 41 |
| 6. Appendix (Examples)..... | 45 |
| Book II Linear groups and collineation groups..... | 49 |
| Chapter I Introduction..... | 49 |
| Chapter II Desarguesian decompositions..... | 56 |
| Chapter III Homologies (general results)..... | 61 |
| Chapter IV Homologies as linear transformations..... | 69 |
| (a) Collineation groups containing homologies..... | 69 |
| (b) An unusual plane of order 3^6 | 80 |
| Chapter V Homologies and generalized Andre' planes..... | 83 |
| Chapter VI Translation planes admitting elations which are not translations..... | 91 |

IV

| | | |
|-----------------|--|-----|
| (a) | A class of planes admitting $SL(2, p^s)$... | 91 |
| (b) | The group generated by elations..... | 94 |
| Appendix | Known finite translation planes and their properties..... | 103 |
| References..... | | 107 |
| Index..... | | 109 |