

INDEX

The references are to the pages of the volume

- Accidental double point of a surface in four-fold space, 157, 170
- Adjoint system of a linear system of curves, 219, 222, 246; relation connecting grade and genus with genus of original system, 225
- Albanese, elimination of multiple points of a surface, 158
- Alexander, on Castelnuovo's reduction of Cremona transformations, 117; identification of the Zeuthen-Segre and the Poincaré topological invariants, 214
- Babbage, transformation of surfaces considered by Noether to non-singular surfaces, 232; deduction of values for invariants when a surface has nodes, 235; normal surfaces in five-fold space with a double line, 246, 281
- Benoist, *see* Clebsch
- Bertini, representation of the pairs of a de Jonquières involution, 119; theorem for certain hyperelliptic plane curves, 120; reduction of plane involutions of two points to four types, 121; Bertini involution in a plane, 124; on reduction of plane involutions and rationality of double planes, 131; theorem for the variable multiple points of the curves of a linear system, 222; Clifford's theorem for least order of a manifold, 266; on the postulation of a complete intersection, 268; primals whose intersection consists of spaces, 276; *Geometria proiettiva degli iperspazi*, 1907 (second edition, 1923), referred to, 120, 268, 276
- Berzolari, in Pascal's *Repertorium der höheren Mathematik*, referred to, 31, 34, 38, 188; on contacts of curves of two plane pencils, 240
- Bitangents of a plane curve, 13, 298
- Bordiga's surface, 273, 274
- Brill, on quadrisecants of curves, 34; on multiple contacts, 42; Brill-Noether, Report to German Mathematical Society on algebraic functions, 1894, referred to, 117, 130
- Brown, the Grassmann representation of the secant spaces of a rational curve, 299
- Burnside, a particular group of Cremona transformations, 121
- Calculus of conditions, 69
- Campedelli, *see* Enriques-Campedelli
- Canonical series on a curve, transformation in a correspondence of two curves, 18; canonical number of curve, 140, 224; canonical system of curves on a surface, 215, 217, 262; canonical curves as defined by Noether, 220, 227; canonical system of a general double plane, 237; undesignated base points of canonical system, 241
- Caporali, a theorem for plane curves, 120; class of an involution, 140; number of double points of a plane pencil, 240; on intersections in four-fold space, 247
- Castelnuovo, condition for an involution on a curve to belong to a linear series, 37; enumerative formulae for curve, 45; reduction of Cremona transformation to quadratic transformations, 117; surface whose prime sections are hyperelliptic, 120, 272; rationality of plane involutions, 139; theorem used by Picard, 169; on fundamental and exceptional curves, 195, 246; and Enriques, the Zeuthen-Segre invariant deduced from an irrational pencil, 191; surface with multiple points at eight associated points, 203, 227; surface having an irrational pencil of curves is irregular, 205; example in regard to transformation of exceptional curve to a

- simple point, 220; and Enriques, undesigned base points of the canonical system, 241; theorem for deficiency of characteristic series, 263; number of special series on a curve as the order of a Grassmannian, 299; hyperelliptic plane curves representing sections of a rational surface, 299; and Enriques, section conditions for a surface to be rational or ruled, 140, 300
- Cayley, on correspondence, 12; on quadrisecants of a curve, 34; on ruled surfaces, 38; on multiple contacts of curves, 42; reduction of plane Cremona transformations to quadratic transformations, 117; pinch points of a double curve of a surface, 158; use of name *cotangent*, 177; example of pinch point, 179; direct calculation of numerical genus of a surface, 200; quartic surface with nodes at eight associated points, 203; on a particular quintic surface, 205; the numerical genus of a ruled surface, 227; birational relation of Kummer and Weddle surfaces, 237; curves on a general surface are complete intersections, 250; on double tangents of a plane curve, 299
- Characteristic series of a linear system of curves, 124; deficiency of, 263
- Chisini, resolution of multiple points of a surface, 158; *see also* Enriques-Chisini
- Chord, common to two curves, 29; chord-curve and trisecant-curve of a surface in four-fold space, 242
- Class of an involution (Caporali), 140; of immersion and canonical number, 222, 225, 251
- Clebsch, on multiple tangents of a surface, 90; in lectures, on Cremona transformation, 117; everywhere finite double integral of a surface, 183, 184; plane representation of double curve of a rational surface, 246; Hessian of a pencil of binary quartics, 277; conditions for roots of binary sextic to be three pairs mutually harmonic, 278
- Clifford, reduction of plane Cremona transformation to quadratic transformations, 117; least order of a manifold belonging to a given space, 266
- Coble, Cremona transformations, 117
- Coincidences in a correspondence with valency, 8; of $r+1$ points in a linear series of freedom r , 10; in a general correspondence, 54, 142
- Completed grade and genus of a curve of a linear system, 139, 140, 221; complete system of sections of a non-singular primal, 295
- Composite curve, genus and grade in terms of components, 223
- Correspondence, of points on a curve, elementary methods, 1; transcendental methods, 46; connexion with theory of degenerate integrals, 59; correspondence of points of two manifolds, 92; of linear spaces, 105; enumerative formulae for, 108; multiple, between two curves, analytic treatment of, 20; of two surfaces, relations of invariants of, 294
- Cotangent of a surface at a pinch point (Cayley), 177
- Coxeter, on lines of a cubic surface, 15
- Cremona, transformations in a plane, 112; on a certain curve on a cubic surface, 130; the Zeuthen-Segre invariant in plane transformations, 240; the Zeuthen-Segre invariant for pencils of surfaces, 241; transformations, groups of, 121, 278, 299
- Curve, fundamental, 194, 246
- Cyclical sets in a correspondence, 143
- Darboux, birational relation of Kummer and Weddle surfaces, 237
- Dedekind, on an algebraical reversion formula, 144
- Defective integrals, in the correspondence of two curves, 22, 59; regular system, 62
- Deficiency, of the characteristic series on a surface, 263; of series on a curve by curve of adjoint system (Picard's theorem), 269
- Dersch, on bitangent curve, 13, 298
- Double, curve of a surface, general property for, 169; points of a surface, in four-fold space, acci-

Cambridge University Press

978-1-108-01782-4 - Principles of Geometry, Volume 6

H. F. Baker

Index

[More information](#)*Index*

303

- dental, 171, 259; double plane, canonical system of general, 237
- Edge, on a certain curve on a cubic surface, 130; treatise on ruled surfaces, 166
- Eliminant, rule for degree of, in parameters which enter, 186
- Enriques, and Chisini, *Teoria geometrica delle equazioni*, referred to, 34, 117, 232; on cubic primal in four dimensions, 137; on rationality of surface representing an involution, 139; on surface with an irrational pencil of rational curves, 147; on ruled surfaces, 168; use of Jacobian of net of curves to obtain canonical system of surface, 183; and Campedelli, *Superficie algebriche*, 1932, referred to, 184, 232, 234, 236, 237, 241; researches on theory of surfaces of 1893, referred to, 184; exceptional curves in a plane, 113; exceptional curves on a surface, 184, 195, 246; and Castelnuovo, the Zeuthen-Segre invariant from an irrational pencil, 191; surface whose canonical system consists of elliptic curves, 205; phraseology for multiple base points of a linear system of curves, 215; on transformation of exceptional curve to simple point, 220; relation of exceptional curve to transformed adjoint system, 236; on surfaces whose prime sections are hyperelliptic, 272; and Fano, groups of Cremona transformations in three-fold space, 278; and Castelnuovo, section conditions for a surface to be rational or ruled, 300
- Enumerative formulae for manifolds defined by matrices, 109
- Equivalence of two manifolds, Severi's theorem for, 293, 297
- Exceptional curves, in plane transformations, 113; on a surface, 184, 195, 246; arising in birational transformation, 201, 202, 203, 210; as considered by Noether, 220, 227
- Fano, on the rationality of a three-fold manifold, 137; and Enriques, groups of Cremona transformations in ordinary space, 278; theorem for surfaces lying on a cubic primal in four-fold space, a particular case, 278; lines lying on cubic primal in four-fold space, 294; manifold which is complete intersection contains only complete intersections, 296
- Fourlet, common normals of two primals, 104; tangent planes to a surface from a multiple line, 188
- Franchis, De, on surface representing points of two curves, 227, 282
- Fundamental curve of a linear system of curves, 194, 210, 246
- Geiser involution in a plane, 122
- Genus of a curve, completed, 139, 221
- Giambelli, number of spaces meeting a curve in higher space, 44; manifolds defined by matrices, 111
- Godeaux, tangent planes to a surface from a multiple line, 188
- Grade of a curve of a linear system, completed, 139, 221
- Grassmannian, of linear spaces, order of, 85; giving number of special series on a curve, 299
- Groups of Cremona transformations in a plane, 299; in space, 278
- Guccia, number of double points of plane pencil, 240; Zeuthen-Segre invariant for pencil of surfaces, 241
- Halphen, common lines of two congruences, 28; results anticipatory of Schubert's ideas, 69
- Hessian of a ruled surface, Salmon on, 27
- Hilton, on a certain curve on a cubic surface, 130
- Hodge, canonical system of a double plane, 237
- Hudson, H. P., treatise on Cremona transformations, referred to, 117, 124, 128, 200
- Hudson, R. W. H. T., treatise on Kummer's surface, referred to, 237
- Humbert, on a particular curve, 24; on hyperelliptic surfaces, 227
- Hurwitz, transcendental methods for theory of correspondence, 46, 54, 56
- Hyperelliptic curves representing sections of a rational surface, 299
- Immersion, class of, and canonical number, 222, 225 (and 251)

- Improper double points of a surface in four-fold space, 157, 170
- Inflexional lines of a surface, 148
- Intersections, residual, of three primals through a curve, 248; of two surfaces, 251; of a primal and a surface, 255; of two primals, 257; of three primals through a surface, 266
- Invariants, the Zeuthen-Segre, 185, 186, 189; the Segre-Severi, 191, 214, 221; modified for isolated nodes, 199, 200; proof of invariance, 206, 210, 221; of a surface which is determined by a matrix, 280; of two surfaces in multiple correspondence, relations of, 294; of an involution, 135
- Involution, not rational, on a curve, 17; number of sets belonging to a linear series, 35; in space of three dimensions, leading to the Geiser involution, 124; rationality of, 132; surface representing, 133; in ordinary space, presumably not rational, 137
- Irrational pencil of curves, not existing on a surface representing an involution, 138; used for defining Zeuthen-Segre invariant, 190; existence involves irregularity of surface, 205
- Irregularity of surface, 227; of surface with nodes at eight associated points, 204; of surface representing points of two curves, 285
- Jacobian, of a net of curves on a surface, 152, 192
- Join of two spaces, 70
- Jonquières, de, on multiple contacts of curves, 39, 42; manifolds defined by matrices, 111; transformation, 115; involution, 118
- Jung, the Zeuthen-Segre invariant in plane transformations, 240
- Kantor, on periodic Cremona transformations, 131, 145
- Klein, manifold on quadric in higher space, 250, 295; on double tangents of a plane curve, 299
- Kohn, manifolds defined by matrices, 111
- Kummer surface, transformation to a Weddle surface, 237
- Lasker, on the theory of Moduls and Ideals, 269
- Lateral, direct, correspondence, 11
- Lefschetz, on correspondence between two curves, 59
- Levi, Beppo, resolution of multiple points of a surface, 158
- Lindemann, *see* Clebsch
- Line, formula for product of two line conditions, 81
- Lüroth, rationality of involutions and surfaces, 131, 132
- Maroni, surface representing points of two curves, 282
- Matrices, manifolds defined by, enumerative formulae for, 109; invariants of, 280
- Maxwell, surface with nine exceptional lines, 232; a general formula for invariants, 235
- Meet of two spaces, 70
- Milninsky, on the Geiser involution, 122
- Möbius, an algebraic reversion formula, 144
- Moore, and Slaught, a particular group of Cremona transformations, 121
- Nanson, manifolds defined by matrices, 111
- Net of curves on a surface, 152
- Netto, on a theorem for symmetrical functions, 136
- Noether, reduction of Cremona transformations to quadratic transformations, 117; on a certain curve of genus three, 130; on the double planes which are rational, 130; on cubic primal in four-fold space, 137; on surfaces with a rational pencil of rational curves, 146; determination of canonical series on a curve in space, 161; on multiple curves of a surface, 163; formulae for the class, stationary points, genus and curve-genus of a surface, 180; procedure by enveloping cone for invariants of a surface, 183; number of conditions for a surface imposed by a given multiple line, 200; surface whose canonical curves are aggregates of elliptic curves, 205; on a particular sextic surface, 205; on

Index

305

- conditions for an adjoint surface at a tacnode, 220; fifteen examples of the invariants of surfaces, 226; on condition of adjointness at an isolated multiple point, 233; incidental proof of Clifford's theorem for special series on a curve, 270; curves on a general surface are complete intersections, 295; particular theorems for a curve in space, 296; canonical surfaces on a primal in four-fold space, 298
- Painlevé, surface with a finite group of birational transformations, 147
- Palatini, manifolds determined by matrices, 111
- Pannelli, Zeuthen-Segre invariant for pencil of surfaces, 241
- Pascal, *Repertorium of higher mathematics, geometry*, 1922, referred to, 199, etc.
- Pencil, irrational, of curves on a surface, 138, 189
- Pezzo, Del, surfaces whose order is one less than the dimension of the space to which they belong, 120; Del Pezzo surfaces, characters, 275
- Picard, on deficiency of series by adjoint system, 169, 269; influence of tacnode on adjunction, 220, 234; on hyperelliptic surfaces, 227
- Pick, on a covariant arising for bitangents of a plane curve, 299
- Pieri, formula for multiple correspondence, 99; applications, 102, 104; coincidences of corresponding lines, 106; manifolds defined by matrices, 111; Zeuthen-Segre invariant for pencils of surfaces, 241
- Pinch points of a double curve of a surface, 158, 176
- Poincaré, theorem of complementary systems of degenerate integrals, 68; topological invariant generalising Euler's, 214
- Poisson, on a theorem for symmetrical functions, 136
- Postulation, of a surface for primals, 263; of a manifold which is complete intersection, 268
- Primals, intersection of three, with a common curve, 248; point equivalence of common curve of four, 249; and surface, residual intersection of, 255; intersection of two with a common curve, 257; intersection of three with a common surface, 266
- Product, and sum, of two correspondences, 6; product of two curves, 57
- Quadratic transformation, reduction of Cremona transformations to, 117
- Quadrisecants of a curve, number of, 33
- Rank and grade for a complete intersection, 75
- Rationality, of an involution, 132, 137; of surface representing a plane involution, 139; rational surfaces, their plane representation, 245
- Re, dal, theorem for surfaces, 300
- Reduced canonical system on a surface, 227
- Richmond, on cubic primal in four-fold space, 137
- Roberts, manifolds defined by matrices, 111
- Rohn, on a plane sextic curve with six nodes, 156
- Room, on generalisation of the Bordiga figure, 274
- Rosanes, on reduction of Cremona transformations to quadratic transformations, 117
- Rosati, correspondence and degenerate integrals, 68
- Roth, multiple tangents, 91; a numerical property of the characters of a surface, 164; inflexional lines for a surface in four-fold space, 175; a surface with a double line, in five-fold space, 246; on composite surfaces, 232
- Ruled surface, by joins of corresponding points of two curves, 17; genus of a curve thereon, 25; number of torsal generators, 26; condition for a surface to be transformable to, 140; characters of 164, 167
- Salmon, bitangent curve, 13, 299; Hessian of a ruled surface, 27, 156; quadrisecants of a curve, 34; multiple tangents of a surface, 90, 91; multiple correspondence, 92;

- manifolds defined by matrices, 111; general formulae for a surface, 159, 169; generalisation to four-fold space, 174; use of four-fold space to solve a problem of ordinary space, 251; treatise on Higher Algebra, 277
- Schottky, on a certain curve, 130
- Schubert, torsal generators of a ruled surface, 26, 102, 166; refers to Halphen as precursor, 28; enumerative formulae for contacts of spaces with curves, 46; reference to his treatise, 28, 69, 96, 102, 103, 104; composite condition for a linear space, 71; on multiple tangents of a primal, 90, 91; notation for calculus of conditions, 98; on umbilici, 102; coincidences of corresponding spaces, 106; manifolds defined by matrices, 111; on quadric surfaces satisfying nine conditions, 251
- Schur, on sextic curve, 274
- Scorza, correspondence and degenerate integrals, 68; on three-folds with curve sections of given genus, 272; on a manifold of order five and dimension three in six-fold space, 278
- Segre, genus of a curve on a ruled surface, 25; sets common to an involution and a linear series, 37; Report on higher space in *Encyklopädie der Mathematischen Wissenschaften*, III, C 7, 1912, referred to (under *Enzykl. Math. Wiss.*), 44, 110, 111, 174; enumerative formulae for manifolds defined by matrices, 110, 111; reduction of Cremona transformations to quadratic transformations, 117; on resolution of multiple points of a surface, 158; inflexional lines of a ruled surface in four dimensions, 174; use of pencil of curves on a surface to obtain invariant, 183; the Zeuthen-Segre invariant, 185; from irrational pencil, 189; Segre-Severi invariant, 191; as grade of canonical system, 197; class of a surface with isolated nodes, 199; influence of nodes on invariants, 199, 200; proof of the invariance, 206, 210; generalisation of the Zeuthen-Segre invariant, 214; Segre-Severi invariant defined by grade of canonical system, 224; modification in birational transformation, 226; Segre quartic surface with double line by projection of Veronese surface, 274; surface formed by lines meeting five planes in four-fold space, 276; elliptic ruled surface normal in space of dimension one less than its order, 277; duality of an elliptic ruled surface and a manifold of order five, 279
- Simple, on a birational transformation in four and five dimensions, 250; cubic primals through a projected Veronese surface are rational cubic primals, 277; on a birational transformation in four-fold space, 279; papers on transformation, and composite surfaces, 282
- Series, characteristic for a linear system of curves, 124, 263; on double curve of a surface by surfaces through the triple points, 169
- Severi, *Trattato di geometria algebrica*, 1926, referred to, 37; enumerative formulae for contacts of spaces with curves, 45; correspondence between two curves, by considering their product, 59; formula for coincidences of corresponding spaces, 105; number of cyclical sets in a correspondence, 145; on improper double points of a surface in four-fold space, 157, 171; elimination of multiple points of a surface, 158; on residual intersection of a surface with a surface through its double curve, 168; use of net of curves on a surface to obtain invariant, 183; on virtual curves, 217; class of immersion and canonical number, 222; on surface representing pairs of points of a curve, 227, 282; modification of Zeuthen-Segre invariant in case of isolated nodes, 235; relation of exceptional curves to transformed canonical system, 236; enumerative formulae for a net of curves on a surface, 241; memoir on intersection of manifolds, 247; application of theory of intersections, 250; canonical curves on part intersection of two primals, 262;

- postulation of surface residual intersection of two primals, 265; postulation of composite surface, 265; point equivalence of a surface, 267; theorems for a complete intersection, 269, 270; extension of a theorem of Bertini, 269; on Picard's theorem for deficiency of series cut by adjoint system, 269; on modular expression of a manifold, 269; fundamental theorem of equivalence of two manifolds, 293, 297; relations of invariants of two surfaces in multiple correspondence, 294; theorem that non-singular primal contains only complete intersections of appropriate dimension, 296; for Grassmannian, 296; theorem of completeness of system of surfaces on a primal, 297
- Simart, *see* Picard
- Slaught, *see* Moore and Slaught
- Spaces, linear, numbers satisfying given conditions, fundamental theorems, 70
- Stationary contact, of a tangent plane with a surface, 149
- Steiner, locus of points of contact of curves of two plane pencils, 240
- Sturm, normals of a surface, 104
- Sum, and product, of two correspondences, 6; sum, and difference, of linear systems of curves, 197
- Surface, representing the sets of an involution, 133; containing a pencil of rational curves, 145; in ordinary space, preliminary properties of, 148; Salmon's formulae for, 159, 164; with only double curve and triple points, 157; in space of four dimensions, 169; in four dimensions which is complete intersection, characters of, 175, 247; residual intersection of two with a common curve, 251; a characteristic equation proved from theory of intersections, 254; and primal, residual intersection of, 255; in four-fold space, number of accidental double points, 259; two, forming complete intersection of two primals, sum of invariants, 262; whose prime sections are hyperelliptic is rational 272; representing points of two curves, 282; representing pairs of points of one curve, 285, 289; representing pairs of points of a curve of genus two, 289; representing lines of a cubic primal in four-fold space, 294
- Tacnode, effect on invariants of surface, 220, 234, 270
- Tangent, multiple, of a manifold, 86; tangent planes to a surface from a multiple line, 187
- Timms, on the general Del Pezzo surface, 276
- Torelli, on de Jonquières formula for multiple contacts of curves, 42
- Torsal chords of a curve, 17; torsal generators of a ruled surface, 26
- Transformations, Cremona, in a plane, 112; groups of, 278, 299
- Trisecants, ruled surface by, 32; to a surface in four-fold space, 172; trisecant curve of a surface in four-fold space, 242
- Ursell, on quadric surfaces satisfying nine conditions, 251
- Vahlen, manifolds defined by matrices, 111
- Val, Du, on bitangent curve for a plane quartic curve, 14
- Valency, of a correspondence, 3, 54
- Veronese, relations of two curves forming a complete intersection, 251; on a rational surface, 274
- Voss, umbilici of a general surface, 102
- Weddle surface, transformation to a Kummer surface, 237
- Welchman, on contact primes of the canonical curve, 43
- White, example of a (2, 1) correspondence between two curves, 24; on the Bordiga surface, 274
- Wiman, groups of Cremona transformations in a plane, 121, 299
- Zeuthen, formula for correspondence between two curves, 19; on torsal generators of a ruled surface, 27; on ruled surface by trisecants of a curve, 32; on quadrisecants, 34; *Lehrbuch der abzählenden Methoden der Geometrie*, 1914, referred to, 19, 27, 34, 42, 69, 91, 181, 183, 235;

- number of triple points of the nodal curve of a given curve, 38; on de Jonquières' formula for multiple contacts of curves, 42; on multiple tangents, 91; on multiple correspondence, fundamental results, 92; on pinch points and close points, memoir, 178; procedure by enveloping cone for invariants of a surface, 183; Zeuthen-Segre invariant, 185, 189, 199, 206, 210, 233, 247; for pencil of surfaces, 214, 241; enumerative formulae for a net of curves on a surface, 241