## CONTENTS

THE AUTHORS	v
FOREWORD BY J. PIAGET	ix
PREFACE	xi
7	
Introduction	
CHAPTER I Before and Beyond the Three R's MILTON SCHWEBEL AND JANE RAPH	3
PARTI	
The Developing Mind	
EDITORS' INTRODUCTION CHAPTER 2 From Preoperational to Concrete	35
Thinking and Parallel Development of Sym-	
bolization HERMINA SINCLAIR	40
CHAPTER 3 Recent Piagetian Research in Learning Studies	57
HERMINA SINCLAIR	19/15
CHAPTER 4 Courage and Cognitive Growth in Children and Scientists	73
HOWARD E. GRUBER	
PART II	
The Developing Child	
EDITORS' INTRODUCTION	109
CHAPTER 5 The Implications of Piaget's Theories	
for Contemporary Infancy Research and Edu- cation	114
BEVERLY BIRNS AND MARK GOLDEN	114

CHAPTER 6 Language and Thought ELEANOR DUCKWORTH	132
CHAPTER 7 The Development of Operations: A	
Theoretical and Practical Matter	155
GILBERT VOYAT	
PART III	
The Developing Teacher	
EDITORS' INTRODUCTION CHAPTER 8 Piagetian Theory As a Model for Open	175
Systems of Education DAVID WICKENS	179
CHAPTER 9 Pedagogical Principles Derived from Piaget's Theory: Relevance for Educational Practice	199
CONSTANCE KAMII	
CHAPTER 10 Piaget's Interactionism and the Process of Teaching Young Children CONSTANCE KAMII	216
CHAPTER II The Use of Clinical and Cognitive In-	
formation in the Classroom  MIREILLE DE MEURON	231
CHAPTER 12 The Having of Wonderful Ideas	258
ELEANOR DUCKWORTH	2=0
CHAPTER 13 The Developing Teacher	278
MILTON SCHWEBEL AND JANE RAPH	
INDEX	293

## **INDEX**

abstraction, 211-212	Centre d'Epistemologie (Geneva),
abstract thought, stage of, 115	57
accommodation:	children:
definition of, 127	adaptation in, 102
regulation of, 111-112	behaviors of, misinterpretation
role of, III	of, 233
adaptation:	classroom organization toward
and cognitive development, 287	needs of, 6-7
as coordination between assimila-	construction of knowledge by,
tion and accommodation, 59	212
Aid to Dependent Children Pro-	curiosity of, and education to-
gram (ADC), 120-121	ward development of intel-
Almy, M., et al., 201, 243	ligence, 7
assimilation:	disadvantaged, and cause and ef-
definition of, 127	fect, 242
regulation of, 111-112	classification skills of, 241
role of, III	cognitive development of, 119
Auerswald, E. H., on disadvantaged	intuitive thought of, 239
children and affective mes-	magical thinking of, 242
sages, 236, 238	mechanically learned situa-
	tions, 242
Baldwin, A., and relationships be-	programs for and structure,
tween parts and wholes, 26	203
Bereiter, C., and Engelmann, S.,	and school, 235
study of "if then," 147	writing and, 287
behaviorists:	discovery of notions on their
and cognitive development, 159	own, 260
and qualitative difference be-	from disorganized families, 237
tween child's world and	experience of, understanding of,
adult intelligence, 158-159	3
Bovet, M., and deviation from de-	fundamental knowledge of, 41
velopmental direction, 58	as generator of own psychologi-
	cal development, 112
Cattell Infant Intelligence Test, 122	ghetto, dialect differences in, 144
causality:	ideas of, 258, 262, 264, 265-266,
acquisition of, 116	267, 272-273, 276, 277
and 18- to 24-months-old child,	acceptance of, 267
100	acting out of, 281

children: (cont'd) skills, Sigel on, 19 teaching materials and, 160 suppression of, 85 class inclusion, 66-69 inner-city, teaching of language classroom: to, 210-211 investigations by, 13 application of Piagetian theory language and linguistic forms, to, 177, 290 evaluation of, 269-275 development of, 110-111 learning and, 281-284 problems in, 260-261 changes in, 234, 245 links between events and, 37 logic in action of, 133 closed system of education and mathematics and, 281-284 interaction in, 181 cooperation vs. competitiveness mental development of, Piaget, 4 moral development of, diversity of cognitive levels in. and Piaget, 4 newborn, intellectual activities adjusting teaching to, 245 of, 109 group activity and, 8-9 object-permanence in, 109 incorrect language forms in, o units and Piagetian physical development, and Piaget, learning theory, 254-256 psychology of, and Piaget, 3 materials, utilization of, 252-253 reasoning of, learning experiorganization of, 252 ments in, 57 assigned seating and, 8 sensori-motor activities of, 109 children's needs and, 6-7 spontaneity of, and learning for development of cognitive processes, 247 process, 112 symbolization of, 100 open-system educational prothinking of: cess and, 191 awareness of contradictions preoperational thought and, 240 and, 11-12 projects to initiate change in, and "dangerous" ideas, 85 234, 245 development of, 11 relationship to child's outside life, 190 environment and, 59 level of, clues for discovering, social system in, 176 store, 247-252 time and, 41 and cognitive development, writing of, 286 247-250 Chittenden, E. A., 199 resolution of conflicts and, on visiting experts in schools, 250-252 "wrong" answers appropriate for Christofedes-Papert, study of children's interpretation of aniclosed-system educational promal groups, 143-144 grams: classification, 26-27, 209 achievement criteria in, 181 cognitive development and, 26behavior as acceptable or unacceptable, 182-183 development through classroom conformity to predetermined store, 248 norms, 182 disadvantaged children and, 241 content of, 180, 181 graphic collections, 27 division of roles in, 182 logical quantifiers, 27 efficiency of learning in, 181

evaluation in, 182 individualization of content and, instructional materials and, 181 instruction strategies in, 180 linear-cumulative process in, 181 objectives of, 180 primary goal of, 180 S-R scheme and, 180 teacher's role in, 182, 189 traditional disciplines and, 181 cognitive change: process of, 78-81 delimitation and, 80-81 language and, 79 life-style and, 79 structure of argument and, 79-80 rate of, 76-78 cognitive development, 222-223 abstraction and, 211-212 acceleration of, dangers in, 103 action as pervasive mode for, 188 active discovery in, 57 adaptation and, 287 ages 4 to 8 years, 36, 37, 43-49 ages 12 to 14 months, 110 alertness and, 274 American psychologists interest in, 117-118 behaviorists and, 159 biological model of, 227 changes in, and dependency on predetermined end-point, 164-165 classroom arrangement to facilitate, 247 concrete operations and, 25-29 construction of knowledge, 222-223, 224 continuity within, 164 as continuum, 116, 187 contradictions and, 288 creativity and, 274 curriculum and, 155, 190 deviations from direction, 58 differences between preschool and school-age child, 29 discontinuity within, 164 discovery and, 207-208, 209 ego development and, 200

emotional aspects of, 128, 129 emotional attachment and, 88 empiristic theory of, 75 environment and, 217, 222 essence of, 258 factors necessary for, 223 fixed order of, 102 foundation for, 265 Head Start and, 119-120, 121 imitation in, 139 infancy and, 114, 115-116 facilitating, 128 schemes in, 138, 139 social class and, 121-124 instructional materials and, 155 interactionism and, 223-230 invention and, 208, 209 language and, 110, 146 role of, 23-25, 129, 132 learning and, 58, 169 Piaget on, 116-117 level of, and integration of information, 166 logic of, lack of experimental knowledge in, 171 logico-mathematical knowledge and, 208 maternal behavior and, 124 maternal deprivation and, 118 motivational aspects of, 128, 129 open-system educational programs and, 185 paradigms of thought and, 167 preformist view of, 75 precocity during first 18 months and, 124 of preschool disadvantaged children, 119, 120 process of, 7 rate of, differences in, 222-223 representational ability and, 138 as result of interaction, 58 self-confidence and, 264 of Sioux children, experiments in, 165-166 slowing down of, 264 social interaction and, 58, 200 socioeconomic status (SES) and, structures of action, 47-48 study of, 35

cognitive development (cont'd) symbolization, of overt actions, processes of, 37 teacher methodology and, 155 theories of, and educational implications, 155 application to educational protransition to higher level of, 60, 163, 263-264 directed, 37 facilitating, 284 functional mechanisms of, 58 universality of sequence, 225 value of breakthroughs in, 265 variable rate of, 102 object permanence; See also preoperational operations; stage of development; sensori-motor development concept: acquisition of, difficulties in, 60 internalizing of, 18 concrete operations. See causality; classification; conservation; groupings; numbers; operations; seriation; space relationships; time relationships conservation, 28 cognitive development and, 28 compensation by reciprocal relationships, 28 décalages between types of, 60, experiments in, 44, 59 identity element in acquisition of, 44 of length, classical problem in, 65 experiments in, 61-66 recent Piagetian research in, of liquids, different containers and, 28, 43-44, 146 experiments in, 11-12 of number, 212 delayed acquisition by disadvantaged children, 239 experiments in, Wohlwill, 169 quantitative constant and, 47

reversibility and, 28 simple additive identities and, 28 tasks in, Sinclair-de-Zwart on, 24 teaching materials and, 169 of volume, experiments in, 70-72 recent Piagetian research in, and weights, 70-71 constants: acquisition of, 46-47 quantitative, definition, 36-37 numerical conservation as, 47 as preparation for reversibility. 36-37 construction, 78 Construction of Reality in the Child, The, (Piaget, 1954), 115, 136 constructivism, 176, 216, 217 contradictions: confrontation of, 287 enabling child to see, 284 "creode," definition of, 164 curricula: child's interests and, 190 content and level of development, 190 development of, 266-267 and Piagetian theory, 268 highly-structured, and teacher, 278 integration of experience in variety of interest areas, 191 interactionism and, 224 learning units, and Piagetian theories, 254-256 in open-system educational programs, 184, 190-191 and operations, development of, Piaget and, 169-170, 177 ready-made, drawbacks of, 112 relationship to child's outside life, 190 Darwin, Charles, 75

Darwin, Charles, 75 evolution theories, development of, 88–102 Lyell, Charles, and, 87–88 relationships to teachers, 86–97

slow growth of evolutionary teaching of skills, 205-207 theories, 92-93 theories of, and schools, 5-10 social context of his thinking, traditional programs in, 181 See also classroom; closed-system suppression of ideas and, 81-82 educational programs; openthought of, architecture of, 91 system educational proas dynamic structure of ideas, grams; teachers educational programs. See closed-97-98 voyages on Beagle, 88, 101 system educational Davis, R., 281 grams; open-system educaday-care centers, 120-121 tional programs recommendations for educators egocentric mentality, 240 in, 126-128 Elkind, D., 243 Engelmann, S., 210, 225 sensori-motor development and, environmentalist philosophy of eddécalages, definition of, 60 ucation, 217 deformation, 37, 49, 50, 51, 53, 281 environment and cognitive deof actions, 55 velopment, 267 cause of, 50 Erikson, E., concepts of trust, auin preoperational linguistic structonomy, and initiative, 129 Escalona-Corman Object Scale, 122 tures, 55 of preoperational physical reality, 51 Flavell, J. H., on cognitive differdevelopment. See cognitive deences between preschool and velopment; moral developschool-age children, 29 Fraisse, P., and Piaget, Traité de Psychologie Expérimentale discovery: and invention, 208 (1953), 247 method of teaching, 200 Freud, and Piaget, 117 Piaget and, 207-208 Froebel, 202 Duckworth, E., 199, 201 functional dependencies, 37, 48, 49 Furth, H., 201, 279, 280 Early Growth of Logic in the on language and logic and deaf Child, The, (Piaget and Inchildren, 24, 145 helder, 1964), 159-160 on meaning of words and piceducation: tures, 206 activity and, 14 Ginsburg, H., and Opper, S., 199 aim of, 22 current practices in, 204 Golden, M., and Birns, B., on sofigurative aspects of knowledge cial class and cognitive deand, 206 velopment in infancy, 121first goal of, 201 interactionism and, 223-230 Gouverneur Health Services Proas linear-cumulative process, 181 grams, 234 physical knowledge and, 208-209 Extended Classroom Project, 235, Piaget on, 199-200 243-247 primary, Sheldon on, 3 Pilot Classroom Project, 235,

reforms needed, and Piaget's

theory, 214

systems of, 179-180

243-247

graphic collections, 27

Referred Group, 235, 236-243

groupings, 26 acts of, 217 class inclusion, experiments in, biological origin of, 176, 205 comprehension of situation and, 66-69 and numbers, 28 and cognitive development, 26 conception of, 171 invention of solution, 217 of equivalence, 26 of identity, 26 logical system of classes, 26 relationships between parts and wholes, 26 Gruber, H. E., and significance of time, 38 Hawkins, David, on curriculum development, 266-267 Head Start programs, 119-120, 121 Heitowit, Dr. E., 281 Himmelweit, H. T., and Swift, B. A., on children's reaction to school, 170 identity, in classroom operation, imitation: deferred, 15 in infant, 139 as main source of learning in first 2 years, 17-18 infancy: construction of knowledge in,

guiding intellectual rule in, 137

guiding motivational rule in, 137

investigations by children in, 13

See also sensori-motor develop-

Inhelder, B., and learning experi-

instructional materials. See mate-

intellectual development. See cog-

nitive development

intelligent acts in, 137

logic of actions in, 137

studies devoted to, 118

Piaget and, 109-110

schemes in, 137, 138

ments, 58

Inhelder, B., and Piaget: balance beam problem, 20

graphic collections, 27

Piaget and, 171, 176, 188, 217-223 psychology of, 171 as structure, 227, 228 turned-on, 8 See also cognitive development intelligence (IQ) tests, 42, 117 for infants, 118-119 interactionism, 176, 216, 217 and educative process, 223-230 intuitive thought, 239 Isaacs, Susan, 202 Judgment and Reasoning in the Child (Piaget, 1928), 145 knowledge: acquisition of, and environment, books and, 290-291 construction of, 136-142, 222 from experience, 212 from within, 199 development of, 175 figurative aspects of, and education, 206 fundamental, acquisition of, 36 change from one age group to another, 42 logico-mathematical, 208, 229 and abstraction, 221 distinction from physical, 176, 214n-215n nature of, and Piaget, 3 physical, 208, 209, 229 and abstraction, 211 distinction from logico-mathematical, 176, 214n-215n real, and acquisition of skills, 41 social, 229 structures of, 218 Kohlberg, L., 216 and development of moral judgment, 10-11 Kuhn, T. S., and awareness of

contradictions, 12-13

intelligence:

Labov, W., and dialect differences learning: in ghetto children, 144 active involvement and, 176, 188, Lai, S., 205 199, 201-204 Laliberte, C., new approach to and cognitive development, 169 spelling, 151 dependency upon, 58 Langer, J., on regulation of assimidifference from, 166-167 lation and accommodation, comprehensions as requisite of, efficiency in, 181 language: conjunctions expressing logical experimentation and, 200 experiments by Centre d'Episterelationships, 145 mologie (Geneva), 57 connections, building new, 148and language, 176, 188 "correct" answers and underas linear-cumulative process, 183 standing of children, 9, 23, and paradigms of thought, 167 Piaget on, 167 24, 133, 201 development of, 193-194 ramifications for, 176 recent research in, 57-72 and level of thinking, 146 dialect differences in ghetto and social conformity, 210 and social interaction among children, 144 and grammar, 151 children, 176 and intellectual development, structural modification 23-25 through behavior and and learning, 176, 188, 201 thought, 99 level of, and intellectual level, learning units. See curricula, learning units logical relationships in, 142, 144, logico-mathematical knowledge. See knowledge, 145 mathematical nonverbal symbolic function and, 128 Lyell, Charles, as mentor of Daroperational thinking and, 22, win, 87-88 246-247 Piaget and, 128, 144, 145 mappings, one-way, 48 poetic aspect of, 135 materials: preoperational stage, concrete application of Piaget's theory to, experiences as bases for, 176 246 teaching of, 201 children's ideas about, 272-273 and size discrimination, 211 closed-system educational procand socialization process, 193-194 ess and, 181 and spelling, 149-153 curriculum guides and, 156 teaching of, 201, 210 development of operations and, and thought, 24, 133-135, 209, 155 experiment with children's 210, 246 ability to work with, 272as adequate expression of, 132use beyond, 134 open-system educational procand understanding of child, 9, 23, ess and, 191 representation and, 196 24, 133, 210 and writing, 151-153 utilization of, 252-253 mathematics, and what children Language and Thought of the Child (Piaget, 1926), 132, 141 really learn, 281-284

maturationist philosophy of education, 217, 227 memorization: emphasis on in lower-class schools, 242 meaningless, and logical thinking in college freshmen, 20 meaningless material and, 17 place in teacher's repertoire, 22 memory tasks: in linguistic structures, 54-56 logical problems, 53-54 physical events, 50-53 preoperational, 49-55 Minuchin, S., 236 Montessori, M., 202 moral development, 204 in classroom socialization process, 192 moral judgment, level of, and relationship to cognitive level, Morf, A., approach to spelling, 151 Newton, Isaac, and limit of domain in scientific change, 80-81 novel behavior, as result of recombination of existing mechanisms, 45-46

numbers, 28-29 class inclusion and, 28 as concrete operation, 28-29 and seriation, 28, 29

object permanence: definition, 36 development of, 116 as first cognitive constant, 46 and infant's everyday experiences, 126 and reversibility, 36 and transitivity, 163 in 2-year-old child, 109 Oleron, P., on language and logic and deaf children, 145 one-way mappings, Grieze, J. B., et al., study in, 48 open-system educational programs, 176, 179 and achievement norms, 185-186

active personality system in, 183, application of knowledge in, 185 autonomy of child in, 192 causal relationships and, 194 conservation, role in, 193 constraints in, 189, 191 contingencies and, 184 curriculum in, continuous reorganization of, 184 nature of, 190-191 diversity of human functioning and, 184 emphasis on individual differences, 183 environmental context of, 184, evaluation in, 184-185 focus on process in, 184, 185, 197 freedom of child in, 192 guidance in, 192-193 hypothesis-making and, 194 identity in, 193 interrelationship of disciplines in, learning process and, 185 logical reasoning in, 193 materials in, 191 moral development and, 192 nonutilitarian aspects of, 184 operation of, 197-198 Piagetian theory of development and, 187 representation and, 195-197 self-evaluation and, 192 socialization process and, 192 teachers and, 186, 188 variables considered in program development, 184 operations, 25, 115 development of, 112, 172 and alertness, 274 importance of, 25 Piaget and, 161-162 intellectual development and, 25-29 language and, 22, 246-247 learning and, 166 meaning and words and pictures,

goal of, 204 nature of, 10 importance of work to, 3 problems of, 159-161 relationships among, 162 major problem in application of theories to, 36 structure of, 37 and identity element, 44 problems of, 3 small impact of work on, 40 teaching and, 168 transitivity and, 161-162 egocentric thought and, 140, 240 See also causality; classification; epistemology and, 175 conservation; groupings; Freud and, 117 numbers; seriation; space fundamental concepts and, 40 as genetic epistemologist, 74, 115 relationships; time relationgenetic psychology and, 175 ships Origins of Intelligence in Children, grouping and, on principle of, The (Piaget, 1952), 115, 136 study of children and, 143-144 history of science and, 75 Parker, R., on teaching of English, infancy, cognitive development perception and perceptual activiin, 115-116 ties, Piaget and, 206 and intelligence, 176, 188, 205, Pestalozzi, 202, 203 physical knowledge. See knowldevelopment of, 222-223 interactionism, and educative edge, physical Piaget: process, 223-230 and abstraction, 211 intuitive thought and, 239 on accelerating development, 35 investigations after World War accommodation, important role 1, 3-4 Judgment and Reasoning in the of, 111, 127 on active learning, 201-205 Child (1928), 145 adaptation, 59, 287 knowledge, acquisition of, 42 American psychologist's recent development in children, 17 interest in, 117 language, and methodology of, assimilation, 111, 127 behavior patterns, concern with nonverbal symbolic function sequence of, 116 as basic for, 129 operational thinking and, 22 biological model of cognitive development, 227 role of, 23-24 thought and, 246 cognitive growth, rate of, 77 through activity, 75 Language and Thought of the concrete experience and, 207-208 Child (1926), 132, 141 logical thinking as nonlinguistic, conservation and, 28 construction of reality, 247 Construction of Reality in the on logico-mathematical knowl-Child, The (1954), 115, 136 edge, 215n criticisms of, on lack of standmental development of child, 4 misinterpretation of his ideas, 114 ardization, 149 on curricula, 169-170 misunderstanding of work, 158 on differences between learning moral development of child, 4 novelty as result of progressive and development, 166-167 discovery and, 207-208 construction, 45 open systems of education, 188 and education, 199-200

Piaget: (cont'd) Pothier, H., new approach to on operations, importance of, spelling, 151 preoperational stage of develop-161-162 Origins of Intelligence in Childment, 46, 110, 115, 168, 226 actions on objects, 247 ren, The (1952), 115, 136 pedagogical principles of, 199 classroom and, 240 perception and, 206 codifying symbols in, 110 concrete experiences as bases of physical development of child, 4 physical knowledge, 215n language, 176 constants, acquisition of, 45-46 Play, Dreams, and Imitation in Childhood, 115, 129, 138 contemplation of actions, 110 deformation in, 49, 50, 51, 53 play and symbolization, 247 primary direction of work, 175 egocentrism in, 110 inflexibility of child's thinking, and reading, writing and arithmetic, mindless mastery of, 6 intelligent functioning of child, regulatory mechanisms, 58-59 reversibility by inversion, 28 schools and, 278 interest in result rather than Science of Education and the process of action, 110 Psychology of the Child and language, 201 (1970), 169 memory tasks in, 49-55 sensori-motor development, misnumerical quantity and, 54 applications of theory, 125-Piaget on, 170 reversibility, 43, 44, 45, 46 sharing of ideas in, 110 simple additive identities, 28 standardization in methodology, probability concept, 280-281 structures underlying behavior, range of possible behaviors, 160, 164 teachers and, 213 reading: theories, application to classand comprehension, 205 room, 243-257 development of mental capacity limitations of, 128-130 for, 17 relevance to education, misdevelopment of structures and, trust of, 259-260 thought, as internalized action, overemphasis on, 201 116 relation to experience, 17 sources of, 23 remedial, teaching of, and mate-Piaget and Fraisse, P., Traité de rials, 156-157 Psychologie Expérimentale representation: (1953), 247 in classroom, 195-196 Piaget and Inhelder, B.: development of, 15, 138 and activity, 15 stages in, 195 Early Growth of Logic in the language and, 139-140 ot, Child (1964), 159-160 materials for development Piaget Object scale, and impoverof. ished babies under 2, 121, progressive development 176 Play, Dreams, and Imitation in reversibility: Childhood (Piaget), 115, acquisition of, 36, 43, 44, 45

annulment as aspect of, 43

129, 138

## INDEX

balls of clay experiment, 48-49 as conservation process, 28 earlier acquisitions preparatory for, 36, 46 explanatory principle changes between ages 5 and importance of, 44 reciprocity as aspect of, 43 Rousseau, pedagogy of, 204 Rowland, G. T., and McGuire, C., school and school systems: children's reaction to, 170 confidence of administration in teachers and children, 7 creativity and, application of Piagetian theory to, 267criteria for application of Piagetian theory to, 5-10 disadvantaged children and, 235, educational goals of, 5, 6 creative and imaginative productivity, 6 and orthodoxy of thought, 6 and educational theories, 5-10 failure of, 231, 232 focus on skills, 204, 205-207 highly centralized, and Piaget, 7 improvement of, and harmony with processes of development, 35 materials, selection of, 156-157 memorization, emphasis on, 242 rules and disadvantaged children, 238 Schwebel, M., study of logical thinking of college freshmen, 19-21 Science of Education and the Psychology of the Child, (Piaget, 1970), 169 sensori-motor development, 16, 75, 115, 116 acceleration of, 121, 125 acquisition of knowledge through direct action, 116 misapplications of Piaget's theory to, 125-126

in newborn child, 109 and Piaget, 163 and practical group of displacements, 163 and practical transitivity, 163 roots of cognitive framework, and symbolic function, 170 seriation, 27-28 acquisition of, 160-161, 167, 168 and qualitative change in structure, 164 and asymmetry, 162 and connexity, 162 and dichotomy, 167 experiments in, 146, 159-160, 165-166 of lengths, 258 nesting boxes, 27-28 and numbers, 28, 29 properties of, 162 role in intellectual development, 27-28 and teaching, 168-169 and transitivity, 161-162 and trichotomy, 167 Sheldon, on primary education, 3 Sigel, I., 243 and classification ability in lower-class children, 19 psychology of intelligence, 171 Sinclair, H., 36-38, 201 directed movement from one level to another, 37-38 language level and intellectual level, 146 research of, 11 and acquisitions reversibility preparatory for, 36-37 and social knowledge, 229 study of "more" and "less" as understood by children, 144 Sinclair-de-Zwart, H.: on conservation tasks, 24 language and operations, 246skills, role of, 228 social class and cognitive development in infancy, 121-124 socialization: causal relationships and, 194 conservation in, 193

and classroom store, 247-252 socialization: (cont'd) closed-system educational development of, 248 programs, 181, 189 identity in, 193 clues from children's actions, language and, 193-194 for learning, 192 concrete experience and, 201 logic and, 193, 194, 195 concrete operations and, 168 peer groups and, 194 creativity and, 112, 171 primary role in organization of developing, 177 knowledge and communicadiscipline and, 288 tion, 188 education of, and Piagetian resolution of conflicts and, 250theory, 270 effectiveness of, 232 sociodramatic play, 18 free use of intelligence by, 278 space relationships, 29 acquisition of knowledge of, highly-structured curricula and, interactionism and, 224, 225 articulation by 18- to 24-monthsintervention in classroom transold child, 109 actions, 245 as concrete operation, 29 in classroom store, 249, 250 introduction of Piaget's theory spelling, 149-153 new method of teaching, 150-153 to, 244 structure: intuition and, 285 of actions, 47-49 and knowledge of child develdevelopment of, 19, 176 opment, 232-233, 278-279 identity element and, 44 and logico-mathematical knowlimportance of, 161, 162 edge, 213 intellectual development and, methodology and development 176-177 of operations, 155 logico-mathematical, 208 in open-system educational procof operations, 47-49 ess, 186, 188, 189-190, 192, as organized knowledge, 218-222, 223 original contributions of, 279 underlying behavior, 59 in Piagetian school, 211-213 suppression of ideas, and developas presenter of material, 200 ment of thought, 81-82, self-confidence and own ideas, 85-86 symbolic function sensitivity to children, 262, 280 symbolization processes, 37 and strictness, 288 development of, 49-55 teachers' guides, and Piagetian and play, 237 theory, 269 Szent-Gyorgyi, A., on books and thought, abstract: knowledge, 290-291 dialogue in, 85 egocentric, 140 as internalized action, 116 development of and taboos, language as reflection of, 24 thought, 85-86 logical, goal of education, 10 teachers: relationship to moral judgement, active involvement and students in learning, 188time relationships: 191, 203, 290 articulation by 18- to 24-monthsapplication of Piagetian theory

old child, 109

to classroom, 8-9

## INDEX

6 year old's concept of, 41

Traité de Psychologie Expérimentale (Fraisse, P., and Piaget, 1953), 247

transitivity, 168
abstract, 163
discovery of, 172n
object permanency and, 163
operations and, 161–162
origin of, 162
practical, 163
sensori-motor period and, 163
seriation and, 161–162

Waddington, C. H., on "creode," 164 Wohlwill, J. F., experiments in

conservation of number, 169

writing:

as developmental, 287
as goal of teaching spelling,
151-153
problems in, 285
think-write metaphor and, 286

Ypsilanti Early Education Program, 216

