

## INDEX

- Abbreviations, 157  
Abramovich, D.R., cit., 93  
Adams-Smith, W.N., cit., 86  
Adkins, E.K., cit., 8, 74, 144, 146, 147  
Adler, R., cit., 90  
Adrenogenital syndrome, 55-56, 79  
Aging process, and androgen, 131  
Aggression  
    relation to Y-chromosome, 75  
    sex, differences, in rodents, 24-26  
Alsum, P., cit., 138  
Amphibians, sex reversal by gonadal hormones, 9  
Anderson, C.O., cit., 4  
Anderson, D., cit., 90, 95  
Anderson, J.N., cit., 134  
Androgen  
    and aging process, 131  
    brain sites of action 129-130  
    contraindication in pregnancy, 71  
    disruptive effect of excess in male, 88, 89  
    and dominance, 53-54  
    deficiency and psychosexual orientation in humans, 68-71  
    effect on rough play, 51  
    in human gender role behavior, 57-58  
    initiating sexual behavior, 3  
    in mammalian fetal circulation, 92-96  
    and masculinization, 14-16  
    organizational effects, 30-31  
    perinatal administration in females, table, 14  
    receptors, 98  
        in AI brain, 78-89  
        in mutants, 100-101  
        in rat brain, 147-151  
    reproductive tract differentiation, 85-86, 96-97  
    resistance syndromes, table, 99  
    and sex preference in rats, 64-65  
    sites of action, 129-130  
    *see also* Gonadal hormones,  
        Testosterone  
Androgen-insensitivity (AI) syndrome, 55, 56, 98  
    behavioral aspects, 77-80  
    classification in humans, 98-99  
    gene, in mice, 75-76  
Androgenization, inhibition by drugs, 124-129, 144  
Anisko, J.J., cit., 26  
Anogenital distance, measure of androgen exposure, 15  
Antibiotics, androgenization inhibition, 127-129  
Aono, T., cit., 79  
Aphasia, following lesions, sex differences, 34  
Arai, Y., cit., 126, 127, 129, 144  
Araki, S., cit., 92  
Archer, J., cit., 24  
Arms, S., cit., 60  
Armstrong, E.A., cit., 38, 39  
Arnold, A.P., cit., 109, 116, 117, 118  
Arnsdorf, R.E., cit., 82, 147  
Aromatization, 132, 133-134  
    inhibition, 140-143  
    role in rat brain differentiation, 134-144, 147, 153  
    sites, in brain, 135-136  
    testosterone to E<sub>2</sub> and neurite development, 124  
Arscott, G.H., cit., 43  
Attardi, B., cit., 79, 148  
Aussel, C., cit., 145  
Avoidance behavior, sex differences, 30-31  
Axonal growth patterns, and steroids, 123
- Baboons, hamadryas and anubis, social organization, 45-46  
Bailey, D.W., cit., 76  
Baker, S.W., vi; cit. 55  
Balagura, S., cit., 35  
Baldwin, F.M., cit., 116  
Barbiturates and androgenization, 127, 129  
Bardin, C.W., cit., 148  
Barfield, R.J., cit., 138  
Barley, J., cit., 145  
Barlow, G.W., cit., 37  
Barnea, A., cit., 127  
Barraclough, C.A., cit., 14, 18  
Barrett, R.J., cit., 30, 31  
Baum, M.J., cit., 4, 14, 88, 89, 138  
Beach, F.A., cit., 4, 5, 8, 13, 14, 17, 78  
Beatty, P.A., cit., 22, 27, 30  
Beatty, W.W., vi, 27, 28-34; cit., 7, 19, 21, 22, 27, 28, 29, 30, 31, 34  
Beckwith, B.E., cit., 32  
Beeman, E.A., cit., 20, 24

- Behavior, sex differences
  - birds, 36-44
  - in human parenting, 58-64
  - humans, 54-73
  - nonreproductive, 19-36
  - rodents, 13-36
  - types, relation to gonadal hormones, 6-8, 20-22
- Belisle, S., cit., 93
- Bell, D.D., cit., 21, 29
- Bengelloun, W.A., cit., 20, 22, 24, 31, 32, 33, 34
- Benoit, J., cit., 82, 83
- Berger, B., cit., 60
- Bernard, B.K., cit., 20, 25
- Bernstein, I.S., cit., 47
- Bertram, B., cit., 38
- Bielert, C., cit., 7
- Bierley, C.M., cit., 31
- Birds
  - behavior, 36-44
  - brain control of song, 116
  - brain structure, sex differences, 115-119
  - courtship displays, 41-44
    - as fitness predictors, 42-43
  - genetic constitution, 81
  - incubation, 39-40
  - nest building, 38-39
  - organizational influences, 8-9
  - sexual behavior, feminization by estrogens, 146-147
  - sexual differentiation of gonads in relation to genetic sex, 81-84
  - song learning, 37-38
- Black, V.H., cit., 92
- Blizard, D.A., cit., 19, 20, 24
- Bloch, E., cit., 90, 91
- Blurton-Jones, N.G., cit., 60
- Bongiovanni, A.M., cit., 146
- Booth, J.E., cit., 143
- Bosch, L.R., cit., 86
- Boss, W.R., cit., 83
- Breuer, H., cit., 134
- Brain
  - bird, morphology, 115-119
  - cellular bases of sexual dimorphisms, 152-156
  - critical period in differentiation, 83-84
  - dendrite density, 104-109
- gonadal steroid receptors, 147-151
- hypothalamus, mouse, neurite outgrowth, 119-124
- lesions, sex differences in response, 32-36
- mammalian, morphological sex differences 102, 105
  - physiological studies, 102
  - possible manifestations, 102
- medial preoptic nucleus, rat, 109-115
- sexual differentiation and aromatization, 139-144
- tissue, metabolism of steroid hormones, 131-137
  - "wiring diagram," 102
- see also* Central nervous system
- Brinkman, A.O., cit., 92
- Bronson, F.H., cit., 15, 17, 20, 24
- Bronstein, P.M., cit., 20, 21, 24
- Brown-Grant, K., cit., 14, 18, 84, 85, 92, 93, 143
- Buchanan, O.M., cit., 42
- Buehler, M.G., cit., 78
- Bull, J., cit., 12
- Bullock, L.P., cit., 148
- Burge, K.G., cit., 14
- Burns, R.K., cit., 5, 9
- Campbell, A.B., cit., 4
- Campbell, H.J., cit., 4
- Canaries, effect of testosterone on song, 116-117
- Cannon, K., cit., 59
- Carpenter, C.R., cit., 44
- Carter, C.S., cit., 14, 103, 115
- Castration
  - aggression, 24-25, 26, 124
  - body weight, 28
  - male sexual behavior in rats, 85
  - open-field activity, 24
  - reaction to shock, 27
  - rough play in monkeys, 50
- Catechol estrogens
  - as antiestrogens, 134
  - and gonadotropin regulation, 134
- Cavazza, F., cit., 82
- Cell nuclei volume, sex differences, 86, 102, 110, 125
  - see also* Sex differences, morphological

- Central nervous system (CNS)  
differentiation, and circulating testosterone levels, 93-96  
hormones important for, 96  
mammalian, and testosterone levels during critical period, 89-92  
period of vulnerability to androgen, 83-88  
*see also* Brain
- Challis, J.R.G., cit., 93
- Chambers, K.C., cit., 22, 32
- Chappelle, T.C., cit., 20, 24
- Charnov, E.L., cit., 12
- Cheng, M.-F., cit., 40, 42
- Cheng, S.C., cit., 40
- Chlorpromazine, blocking androgenization, 126
- Choat, H.G., cit., 10
- Choudhury, M., cit., 91, 92
- Christensen, A.K., cit., 92
- Christensen, L.W., cit., 109, 114, 129, 140
- Christenson, T., cit., 26
- Clark, J.H., cit., 134
- Clarke, I.J., cit., 14, 84, 96
- Clayton, R.B., cit., 128
- Clemens, H.P., cit., 9
- Clemens, L.G., cit., 7, 15, 140, 144, 146, 150
- Clements, J.A., cit., 70
- Colchicine, and androgenization inhibition, 128, 130
- Collard, J., cit., 116
- Collas, E.C., cit., 37, 39
- Collas, N.E., cit., 37, 39
- Collier, G., cit., 40
- Colvin, G.G., cit., 23
- Congenital adrenal hyperplasia (CAH), *see also* adrenogenital syndrome
- Coniglio, L.P., cit., 7, 15
- Conner, R.L., cit., 20, 25
- Corey, S.M., cit., 31
- Count, E.W., cit., 61
- Cowan, W.M., cit., 123
- Cox, V.C., cit., 28
- Crew, F.A.E., cit., 82, 147
- Critical period, 3-5  
and aggression, 25  
alterations in length, 130-131  
of CNS differentiation, 97, 98, 92
- definition, 81
- end of, 150
- mammalian, 83-85
- in neuronal development, 124
- in rodents, 15-16
- in sexual orientation, 72
- in various species, 4
- Crossley, D.A., cit., 16
- Crowley, W.R., cit., 38
- Czaja, J., vi, cit., 21, 29
- Dantchakoff, V., cit., 82
- Darrah, H.K., cit., 128
- Dattwyler, R.J., cit., 145
- Davidson, J.M., cit., 109
- Davies, I.J., cit., 134
- Davis, H., cit., 21, 27
- Davis, P.G., cit., 138
- Dawood, M.Y., cit., 93
- de Araujo-Carlini, E.L., cit., 32
- Defeminization, definition, 5
- De Kretser, D.M., cit., 90, 91, 95
- Demasculinization, definition, 5
- Dendrites  
in brain, sex differences, 104-109, 154  
differentiation, induction, 123
- de Nechaud, B., cit., 145
- Denef, C., cit., 19, 20, 24, 132
- Denti, A., cit., 31
- Deol, G., cit., 22, 33
- Desjardins, C.H., cit., 17, 20, 25
- DeVore, I., cit., 62
- Diamond, M., cit., 96
- Dihydrotestosterone  
intermediate metabolite for testosterone, 132  
as mediator of testosterone action, 137-139  
species differences in effectiveness, 139  
*see also* Testosterone
- 5 $\alpha$ -Dihydrotestosterone (DHT), reproductive tract differentiation, 97, 98, 100
- Dilger, W.C., cit., 39
- Dimorphism  
definition, 1-2  
structural, 102-109  
*see also* Sex differences, Sexually dimorphic behavior

- Döcke, F., cit., 140  
 Doerr, P., cit., 68  
 Dolhinow, P., cit., 61  
 Dominance hierarchy, in nonhuman primates, 46-54  
 Domm, L.V., cit., 82  
 Dörner, G., vi, 64-73, 131; cit., 64, 65, 66, 67, 68, 69, 70, 71, 72, 87, 93, 102, 125, 140  
 Doughty, C., cit., 143, 145  
 Dubuc, P., cit., 21  
 Duck-Chong, C.J., cit., 91  
 Dunlap, J.L., cit., 15, 19  
 Dyer, R.G., cit., 102, 103  
 Dzwillo, M., von, cit., 10
- Eaton, G.G., cit., 47  
 Edwards, D.A., cit., 4, 14, 17, 20, 24, 25  
 Eguchi, Y., cit., 92  
 Ehrhardt, A.A., vi, 54-58, 79, 80; cit., 55, 56, 64  
 Eisenberg, L., cit., 44  
 Eleftheriou, B.E., cit., 76  
 Ellendorf, F., cit., 134  
 Emery, D.E., cit., 15  
 Engelsen, G.H., cit., 39  
 Epple, G., cit., 46  
 Epstein, E., cit., 31  
 Erpino, M.J., cit., 20, 24  
 Eskay, R.L., cit., 92  
 Estradiol  
     and aggression, 25  
     blocking of androgen binding, 148  
     as mediator of testosterone action, 138, 139  
     *see also* Estrogen  
 17 $\beta$ -Estradiol ( $E_2$ ), and neuronal differentiation, 124  
 Estrogen  
     and body weight, 27-28  
     CNS differentiation, 96  
     feedback, and LH response, 65-66  
     female sex differentiation in birds, 146-147  
     and human gender role behavior, 57  
     inhibitors, 143  
     levels, in homosexual males, 68-69  
     receptors, in rat brain, 140, 147-151  
     in running wheel activity, 23  
     *see also* Estradiol, Gonadal hormones
- Estrogen-binding protein (fEBP), fetoneonatal, protective role, 144-146  
 Eye opening, and critical period, 4
- Fairall, N., cit., 43  
 FALE (feminine male), 112, 114  
 Farrell, A., cit., 19  
 Fatschel, J., cit., 71  
 Feder, H.H., cit., 138  
 Feeding, and body weight, sex differences, 27  
 Fein, R., cit., 60  
 Feldman, H., cit., 59  
 Feldman, S.C., cit., 90, 91  
 Fels, E., cit., 86  
 Feminization, definition, 5  
     disorder, 99  
 Fessler, R.G., cit., 21, 27  
 Field, P.M., cit., 18, 103, 104, 109  
 Fish, sex reversal by gonadal hormones, 8-10  
 Fishelson, L., cit., 10  
 Fishman, J., cit., 132, 134, 135  
 Floody, O.R., cit., 25  
 Flutamide, antiandrogen, 144  
 Foote, C.L., cit., 9  
 Fox, T.O., vi, 148-151; cit., 148  
 Fricke, H., cit., 11  
 Fricke, S., cit., 11  
 Friedmann, H., cit., 40  
 Frith, H.J., cit., 40
- Gallagher, T.F., cit., 82  
 Gallien, L.G., cit., 9  
 Gandelman, R., cit., 15  
 Gartlan, J.S., cit., 47  
 Gender role behavior, 55-58  
 Genes  
     control of sexual differentiation, 74-80, 152-153  
     defects, in human reproductive tract development, 98-102  
 Gentry, R.T., cit., 20, 21, 23, 28  
 George, F.W., cit., 135  
 Gerall, A.A., vi, 13, 131, 137, 139; cit., 7, 14, 15, 18, 19, 20, 23, 85, 86, 115, 139  
 Gerbils  
     aggression, hormonal control, 26  
     gonadal hormones and body weight, 29

- Gerlach, J.L., cit., 121  
Gethmann, U., cit., 134  
Gibbs, C., cit., 133, 135, 140  
Gil, D.G., cit., 61  
Giles, H.R., cit., 93  
Gilliard, E.T., cit., 41  
Gladue, B.A., cit., 144  
Globus, A., cit., 123  
Gloyna, R.E., cit., 132  
Goldfoot, D.A., cit., 5, 49, 52, 53, 138  
Goldman, A.S., cit., 21, 26, 32, 33, 78  
Goldstein, J.L., cit., 97, 98  
Gonadal hormones  
    critical period of brain cell maturation, 130-131  
    effect following lesions, 33-34  
    and genetic input, 76-77  
    and homosexuality, 64-73  
    intracellular metabolism, 132-133  
    and male-typical behavior, three types, 6-8  
    metabolism by brain tissue, 131-137  
    in nonreproductive behavior in rodents, 19-36  
    possible mechanisms of affecting dimorphism in neurons, 106, 108  
    and volume of medial POA, 111-113  
    *see also* Androgen, Estrogen, Testosterone  
Gonadotropin  
    concentrations in fetus, 92  
    regulation  
    and catechol estrogens, 134  
    disruption in rats, 86, 87  
    effect of testosterone in guinea pig fetus, 92  
Gorski, R.A., vi, 109-115; cit., 21, 28, 35, 109, 110, 111, 112, 113, 114, 126, 127, 129, 140, 144, 154  
Gottlieb, D.J., cit., 123  
Gottlieb, H., cit., 143  
Goy, R.W., vi; cit., 3, 4, 5, 6, 7, 8, 14, 18, 21, 29, 48, 49, 50, 51, 52, 53, 54, 71, 79, 83, 84, 92, 93, 138  
Grady, K.L., cit., 4, 85  
Grasso, J.A., cit., 91  
Grave, G.D., cit., 130  
Gray, J.A., cit., 20, 24  
Gray, P., cit., 22  
Green, R., cit., 72  
Greenough, W.T., vi, 104-108; cit., 103, 104, 105, 106, 107, 109  
Grevendal, L., cit., 116  
Griffin, J.E., cit., 100  
Griffo, W., cit., 25  
Guinea pig, androgen production in fetal, 92  
    critical period of CNS differentiation, 92  
Gutstein, J., cit., 48  
Hackmann, E., cit., 10  
Haffen, K., cit., 147  
Hall, N.R., cit., 20, 24, 138  
Hamburg, D.A., cit., 60  
Hamilton, W.J., III, cit., 37  
Hamsters  
    aggression, sex differences, 25  
    compared with rats in response to hormone treatment, 14-15, 16  
    gonadal hormones and body weight, 29  
Harlan, R.E., cit., 131  
Harrell, L.E., cit., 35  
Harris, G.W., cit., 4, 85  
Harris, J.O., cit., 116  
Hart, B.L., cit., 17  
Hatton, G.I., cit., 111  
Hayashi, S., cit., 129, 140, 143  
Hays, H., cit., 39  
Herbst, A.L., cit., 146  
Herrick, E.H., cit., 116  
Hinde, R.A., cit., 36, 37, 39, 41, 42  
Hinz, G., cit., 125  
Hirsch, S.M., cit., 20, 21, 24  
Hitchcock, F.A., cit., 23  
Hjorth, I., cit., 37  
Hobbs, S.H., cit., 21, 27  
Hogan-Warburg, A.J., cit., 37  
Höhn, E.O., cit., 40  
Holman, S.D., cit., 77  
Homosexuality  
    endocrine basis, 64-73  
    learning hypothesis, 64, 72  
Hooker, B.I., cit., 116  
Hormones, *see* Gonadal hormones  
Hormone-behavior relationships, types, 6-8  
Howard, E., cit., 37  
Humans, sex differences in behavior, 54-73  
    biological and environmental determinants, 54-58  
    categories, 55

- defects in reproductive tract development, 98-102; *see also* Adrenogenital syndrome  
 homosexuality, 64-73  
 parenting, 58-64
- Hunt, G.L., Jr., 42, 147  
 Hunt, M.W., cit., 42, 147  
 Hutchinson, R., cit., 20, 25  
 Hutchison, J.B., cit., 36, 38  
 Huxley, J.S., cit., 41  
 Hydroxyurea, effects on androgenization, 127-128  
 Hypothalamus, mouse, neurite outgrowth, 119-124
- Ifft, J.D., cit., 130, 153, 154  
 Ikard, W.L., cit., 22  
 Ikonen, M., cit., 90  
 Imperato-McGinley, J., cit., 80, 132  
 Incubation, of bird eggs, 39-40  
 Inslee, T., cit., 9  
 In utero position, and sexual behavior, 15
- Jaffe, R.B., cit., 93  
 Jakway, J.S., cit., 6  
 Janowiak, P., cit., 23  
 Japanese quail  
     effect of antiestrogen, 144  
     estrogens and sexual response, 146-147  
     hormone injection during incubation, 8-9  
 Jenni, D.A., cit., 40  
 Johnson, D.A., cit., 33  
 Johnston, C., cit., 148  
 Joslyn, W.D., cit., 50  
 Josso, N., cit., 97  
 Jost, A., cit., 97  
 Judd, H.L., cit., 93
- Kajishima, T., cit., 10  
 Kánter, R.M., cit., 60  
 Kao, L.W.L., cit., 132, 133  
 Karsch, F.J., cit., 71  
 Katzenellenbogen, B.A., cit., 134  
 Kearly, R.C., cit., 31  
 Keesey, R.E., cit., 35  
 Kemnitz, J.W., cit., 28, 35  
 Kikuyama, S., cit., 130
- Kim, C.K., cit., 93  
 Kincl, F.A., cit., 96, 146  
 King, J.M., cit., 28  
 Klaus, M.H., cit., 61, 63  
 Knuppen, R., cit., 134  
 Kobayashi, F., cit., 127  
 Kobayashi, R.M., cit., 135, 136  
 Kondo, C.Y., cit., 34  
 Konishi, M., cit., 37  
 Korenbrot, C.C., cit., 138  
 Korn�uth, S.E., cit., 123  
 Köster, G., cit., 134  
 Kozelka, A.W., cit., 82  
 Krasnoff, A., cit., 31  
 Krecek, J., cit., 21, 27  
 Kuehn, R.E., cit., 4, 14  
 Kulin, H.E., cit., 71  
 Kummer, H., cit., 44, 45, 46, 48  
 Kunzig, H.J., cit., 93
- Lack, D., cit., 38  
 Lade, B.I., cit., 37  
 Ladosky, W., cit., 126, 146  
 Lancaster, J.B., cit., 44, 48  
 Landmesser, L., cit., 154  
 Larsson, K., cit., 138  
 Laskowski, W., cit., 10  
 Lassig, B.R., cit., 10
- Learning  
     hypothesis, homosexuality, 64, 72  
     and performance, sex differences, in rodents, 29-32  
     of songs by birds, 37-38  
 Leathem, J.H., cit., 14  
 Lee, C.T., cit., 25  
 Lee, R.B., cit., 62  
 Legrand, J., cit., 123  
 Lehrman, D.S., cit., 36, 39, 41, 42  
 Leifer, A.D., cit., 61  
 Lenard, L., cit., 34  
 Lentz, F.E., Jr., cit., 31  
 Leonard, S., cit., 116  
 Leutenegger, W., cit., 44  
 Levine, S., cit., 4  
 Lewis, M., cit., 61  
 Lieberburg, I., vi; cit., 79, 136, 140, 141, 143  
 Lieblich, I., cit., 22, 33  
 Lill, A., cit., 37, 42, 43  
 Lindburg, D.G., cit., 45, 52

- Lindner, H.R., cit., 127  
Lloyd, T., cit., 134  
Lofts, B., cit., 36  
Lording, D.W., cit., 90, 91, 95  
Lorens, S.A., cit., 34  
Lorenz, K., cit., 41  
Lowenthal, M.F., cit., 59, 61  
Lumia, A.R., cit., 26  
Luteinizing hormone (LH)  
and estrogen feedback in rats, 65-66,  
71  
in human males, 66-67, 69  
in rat fetuses, 91  
Luttge, W.G., cit., 20, 24, 138
- McDonald, P.G., cit., 143  
McEwan, B.X., vi, 78; cit., 121, 136, 137,  
140, 142, 143, 145, 146, 148, 152  
McGill, T.E., cit., 4, 76, 77  
Machado-Magalhaes, H., cit., 32  
Maclusky, N.J., cit., 148, 149  
McNemar, Q., cit., 31  
Madden, J.D., cit., 98  
Manning, A., vi, 74-77; cit., 74, 76, 77  
Maqueo, M., cit., 96  
Marcus, D.S., cit., 140  
Marić, D., cit., 86  
Marks, H.E., cit., 21, 27  
Marler, P., cit., 37, 41, 43  
Marmor, J., cit., 72  
Martinez-Vargas, M.C., cit., 147  
Martini, L., cit., 132, 135  
Martins, T., cit., 8  
Martucci, C., cit., 134  
Masculinization  
in adrenogenital syndrome, 55-56,  
98-102  
definition, 5  
effects of androgen, 14-16  
of gender role behavior, 55-58  
in normal development, 85, 96-98  
Masica, D.N., cit., 56, 79  
Mason, W.A., cit., 46  
Maze learning, sex differences in rats,  
31-32  
Medial preoptic nucleus, rat  
effect of gonadal hormones, 111-113  
size, sex differences, 109-115  
Merchant-Larios, H., cit., 91  
Meusy-Dessolle, N., cit., 93
- Meyer-Bahlburg, H.F.L., cit., 72, 75  
Millar, R., cit., 43  
Miller, A.E., cit., 43  
Miller, R.A., cit., 81  
Mittwoch, U., cit., 75  
Money, J., cit., 55, 56, 57, 79  
Mongkonpunya, K., cit., 93  
Morest, D.K., cit., 123  
Morphological bases of sexual dimorphism,  
102-124  
*see also* Sex differences  
Morrell, J.I., cit., 155  
Morris, D., cit., 41  
Moss, H.A., cit., 61  
Moynihan, M., cit., 41  
Murgita, R.A., cit., 145  
Murton, R.K., cit., 36
- Nadler, R.D., cit., 35, 86, 129, 140  
Naess, O., cit., 78  
Naftolin, F., cit., 96, 132, 133, 134, 135,  
155  
Nakai, T., cit., 128  
Nalbandov, A.V., cit., 93, 96  
Nance, D.M., cit., 28, 35, 131  
Narbaitz, R., cit., 90  
Neill, J.D., cit., 85  
Nelson, J.B., cit., 37, 43  
Nest building, 38-39  
Neumann, F., cit., 79  
Neurite outgrowth, effect of gonadal  
hormones, 120-124, 154  
Neurotransmitters  
as brain organizers, 125  
in sexual behavior and orientation, 72  
Newton, N., cit., 60  
Nicolai J., cit., 40  
Niemi, M., cit., 90  
Noble, R.G., cit., 16  
Nonreproductive behaviors, sex differ-  
ences, 19-36  
aggression, 24-26  
effects of gonadal hormones, table,  
20-22  
open-field activity, 23-24  
reactivity to shock, 27  
running wheel activity, 23  
taste preference, 26-27  
North, M.E.W., cit., 38  
Norton, B., cit., 132, 135

- Nottebohm, F., vi, 6, 38, 43, 129-131; cit., 37, 38, 109, 115, 116, 117, 118, 119, 130, 131, 154
- Nottebohm, M., cit., 37, 38
- Noumura, T., cit., 90
- Nunez, E., cit., 145
- Ohno, S., cit., 75, 76, 78, 148
- Open-field activity, sex differences, 23-24
- Organizational hypothesis, 2-3, 5, 13, 16
- Orcutt, F.S., cit., 9
- Ortiz, E., cit., 92
- Ozon, R., cit., 147
- Palade, G.E., cit., 91
- Pannabecker, R., cit., 90
- Paolino, R.M., cit., 20, 25
- Paré, W.P., cit., 27
- Parenting, human, sexual dimorphism, 58-64
- Pargyline, and sexual behavior and brain structure, 125
- Parker, J.E., cit., 43
- Parlee, M.A., cit., 60
- Parmelee, D.R., cit., 40
- Parnavelas, J.G., cit., 123
- Parvizi, N., cit., 134
- Paup, D.C., cit., 14
- Payne, A.H., cit., 93
- Payne, A.P., cit., 20, 25, 26, 40
- Payne, R.B., cit., 40
- Period of maximal susceptibility (or sensitivity), *see* Critical period
- Peripheral organ changes, and sexual behavior, 17-18
- Peters, P.J., cit., 25
- Peterson, R.E., cit., 80, 132
- Pfaff, D.W., cit., 20, 24, 25, 102
- Phallus
- delayed development, 80
  - effect of EB, 139
- Phelps, C.P., cit., 130
- Phillips, A.G., cit., 22, 33
- Phoenix, C.H., cit., 2, 5, 14, 48, 75, 84, 93, 138
- Picon, R., cit., 90, 91
- Pilar, G., cit., 154
- Pirani, B.B., cit., 93
- Plapinger, L., cit., 145
- Pomerantz, D.K., cit., 93, 95
- Popper, D., cit., 10
- Poulsen, H., cit., 116
- Powell, D.A., cit., 20, 25
- Powley, T.L., cit., 35
- Prestige, M.C., cit., 154
- Price, D., cit., 90, 92
- Primates, nonhuman, sexual dimorphisms, 44-58
- dominance hierarchy, 46, 53-54
  - juvenile play, 48-51, 56
  - mounting behavior, 51-53, 54
  - social roles, 47-48
- Progesterone
- and aggression, 25
  - and androgenization, 126-127
  - in human gender role behavior, 57-58
  - see also* Estrogen
- Pröve, E., cit., 116
- Pseudohermaphroditism, 98-102
- Psychotropic drugs, and androgenization inhibition, 124-129
- brain structure, 125
  - sexual behavior, 125
- Puberty, onset, and perinatal hormone manipulation, 18
- Pyridostigmine, effects on sex differences and brain structure, 125
- Quadagno, D.M., cit., 20, 24
- Raisman, G., cit., 18, 103, 109
- Rats
- androgen production in fetal, 90-92
  - aromatization in brain differentiation, 139-144
  - comparison with hamsters in response to hormone treatment, 14-15, 16
  - reproductive tract differentiation, 96
  - size of medial POA, 109-115
  - steroid receptors in brain, 147-151
- Ray, O.S., cit., 30, 31
- Raynaud, J.P., cit., 96, 145
- Reactivity to shock, sex differences, 27
- Rebière, A., cit., 123
- Receptors, gonadal steroid
- in AI brain, 78-79
  - estrogen, in rat brain, 140, 147-151
  - in mutants, 100-101

- Reddy, V.V.R., cit., 140  
Reed, K.C., cit., 135, 136  
Reinboth, R., cit., 10  
Reiter, E.O., cit., 71  
Rennie, P.S., cit., 133  
Renz, F.J., cit., 16, 86  
Reproductive tract, differentiation  
    avian, 81-83  
    human, 98-102  
    mammalian, 83-88, 96-97  
Reserpine, effect on sexual behavior and  
    brain structure in rats, 125  
Resko, J.A., cit., 7, 15, 58, 84, 93, 95  
Reyes, F.L., cit., 93  
Rice, M., cit., 26  
Riddell, W.I., cit., 31  
Robel, R., cit., 133  
Robertson, D.R., cit., 10  
Robinson, J.D., cit., 93  
Robson, K.S., cit., 61  
Rodents  
    androgenization, inhibition by drugs,  
        124-129  
    differentiation of sexual behavior,  
        13-19  
    sex differences in nonreproductive  
        behavior, 19-36  
    *see also* Gerbils, Hamsters, Rats  
Rohde, W., cit., 67, 69  
Rollins, B., cit., 59  
Roosen-Runge, E.C., cit., 90, 95  
Rosenblum, L., cit., 61  
Rossi, A.S., vii, 58-60; cit., 59, 60  
Rothstein, S.I., cit., 40  
Rowe, P., cit., 93  
Rowell, T.E., cit., 44, 47, 48  
Roy, E.J., cit., 20, 21, 23, 29  
Ruh, M.F., cit., 143  
Ruh, T.S., cit., 143  
Running wheel activity, sex differences,  
    23  
Rusak, B., cit., 106
- Sachs, B.C., cit., 15, 86, 88, 89  
Sadleir, R.M.F.S., cit., 43  
Salaman, D.F., cit., 127, 128, 130, 140  
Sanyal, M.K., cit., 90, 91  
Sawyer, C.H., cit., 23, 130  
Saxena, B.B., cit., 93  
Sayler, A., cit., 26
- Scheibel, A.B., cit., 123  
Schlegel, R.J., cit., 90  
Schmitt, F.O., vii  
Schretlen, P., cit., 88, 89  
Schultz, F.M., cit., 97  
Schwartz, M., cit., 56  
Schwarzl, W.C., cit., 79  
Scott, G., cit., 123  
Scouten, C.W., cit., 22, 24, 30, 31  
Selmanoff, M.K., cit., 75, 135  
Sex differences  
    biological and environmental determinants, 54-58  
    categories, 55  
    genetic aspects, 74-80  
    homosexuality, 64-73  
    human, 54-73  
    morphological, brain  
        avian, 115-119  
        mammalian, 102-115, 119-124  
    nonhuman primates, 44-58  
    nonreproductive behavior in rodents,  
        19-35  
        in parenting, 58-64  
        volume of cell nuclei, 86  
Sex reversal  
    by gonadal hormones in Amphibia, 9  
    spontaneous, in fish, 10-11  
Sexual differentiation  
    behavior, in rodents, 13-19  
    cellular and molecular aspects, 81-152  
    effect of testosterone levels, 89-96  
    genetic aspects, 74-80  
    gonads and reproductive tract, birds,  
        81-83  
    gonads and reproductive tract,  
        mammals, 83-88  
    of mammalian CNS, critical period in  
        testicular development, 90-92  
Sexually dimorphic behavior  
    in birds, 36-44, 152  
    in humans, 54, 55, 155-156  
    in human parenting, 58-64  
    morphological bases, 102-115  
    in nonhuman primates, 44-54, 152  
    in rodents, 19, 26, 103, 153  
Shapiro, B.H., cit., 21, 26, 78  
Shapiro, D.Y., cit., 10, 11  
Shapre, L.B., cit., 47  
Sherlock, D.A., cit., 104  
Sherwood, M.R., cit., 14, 84, 92, 93

- Shoemaker, H.H., cit., 116  
 Short, R.V., cit., 4, 14  
 Shryne, J.E., cit., 127  
 Siders, W.A., cit., 34  
 Slater, J., cit., 20, 24  
 Slob, A.K., cit., 21, 27, 29  
 Snow, D.W., cit., 37  
 Social factors, in sexual behavior
  - in baboons, 45-46
  - in fish, 10-11
  - in humans, 64, 72, 155-156
 Södersten, P., cit., 87  
 Soloff, M.S., cit., 145  
 Southwick, C.H., cit., 44  
 Spanier, G., cit., 59  
 Stahl, F., cit. 67  
 Stark, A., cit., 22  
 Staudt, J., cit., 87, 102  
 Steel, E., cit., 39  
 Steinbeck, H., cit., 79  
 Steinberger, E., cit., 91, 92  
 Stern, D., cit., 61  
 Stern, J.J., cit., 23  
 Steroid hormones
  - metabolism, by brain tissue, 131-137
 Steroid receptors
  - in developing mouse and rat brain, 147-151
 Stetson, M.H., cit., 106  
 Stewart, A.D., cit., 75  
 Stewart, J., cit., 22, 32  
 Stinnakre, M.G., cit., 91  
 Stone, C.P., cit., 31  
 Studelska, D.R., cit., 22, 34  
 Swanson, H.H., cit., 4, 16, 20, 25, 26, 86, 131
- Taleisnik, S., cit., 87, 88  
 Tarttelin, M.F., cit., 21, 28, 29  
 Taste preferences, sex differences, in rodents, 26-27  
 Telegdy, G., cit., 22  
 Testes, fetal, and steroidogenesis, 89-91  
 Testicular development, and testosterone levels during critical period, 89-92
- Testosterone
  - and aggression, 24-26
  - in amniotic fluid, 70, 93
  - and anovulatory sterility, 126
  - biologically active metabolites, 136-137
 and bird song, 43, 115-116  
 and brain morphology, in birds, 116-119  
 feeding and body weight, 29  
 in learning, 31-32  
 levels
  - in heterosexual and homosexual males, 67
  - in mammalian fetus and CNS differentiation, 93-96
  - and testicular development during critical period, 89-92
 and masculinization, 84, 92  
 mechanism of action in reproductive tract development, 98, 100  
 metabolic pathways, 132-154  
 production in fetal rat and guinea pig, 90, 92  
 $5\alpha$ -reduction, 132, 133  
 in response to brain damage, 33  
 in running wheel activity, 23  
 in shock reactivity, 27  
*see also* Androgen, Gonadal hormones  
 Turner's syndrome, 55, 56, 79, 153  
 Thiessen, D.D., cit., 26  
 Thompson, M.L., cit., 76  
 Thorpe, W.H., cit., 37, 116  
 Tiefer, L., cit., 14  
 Tinbergen, N., cit., 37, 41  
 Tobet, S., cit., 15  
 Tomasi, T.B., cit., 145  
 Toran-Allerand, C.D., vii, 119-122; cit., 121, 122, 151, 154  
 Trampuž, V., cit., 71  
 Tryon, R.C., cit., 31  
 Tucker, G.R., cit., 76  
 Turkelson, C.M., cit., 15, 94  
 Turner, C., cit., 35  
 Turner, J.W., cit., 26
- Uriel, J., cit., 145
- Vaccari, A., cit., 36  
 Vale, J.R., cit., 77, 152  
 Valenstein, E.S., cit., 21, 22, 26, 35  
 Valle, S.R., cit., 8  
 Vanderbergh, J.C., cit., 14, 16  
 van der Werff ten Bosch, J.J., cit., 21, 27, 29, 86, 131, 138

- Ventromedial hypothalamus (VMH)  
  estrogens and feeding, 28  
  lesions, 35
- Verner, J., cit., 39
- Veyssi, G., cit., 93
- Villee, C.A., cit., 90, 91
- Vito, C.C., cit., 148
- vom Saal, F.S., cit., 15
- Vreeburg, J.T.M., cit., 137, 138, 143
- Wade, G.N., cit., 20, 21, 23, 26, 28, 29, 35x
- Wagner, J.W., cit., 140
- Wallen, K., cit., 49, 52
- Walsh, P.C., cit., 98, 100
- Ward, I.L., cit., 15, 29, 86, 87, 88, 90, 91,  
  94, 95, 137
- Warne, G.L., cit., 93
- Warren, D.W., cit., 90
- Washburn, S.L., cit., 61
- Watson-Whitmyre, M., cit., 106
- Weisz, J., vii, 83, 96; cit., 87, 88, 90, 91,  
  94, 95, 132, 133, 134, 135, 137,  
  140
- Weller, M.W., cit., 40
- Westley, B.R., cit., 128, 140
- Weston, L.M., cit., 31
- Whalen, R.E., cit., 7
- Whiting, B.B., cit., 61
- Whiting, J.W.M., cit., 61
- Whitsett, J.M., cit., 14, 16, 25
- Wickler, W., cit., 42
- Wieland, S.J., cit., 148, 149, 150
- Wiley, R.H., cit., 37, 42
- Willier, B.H., cit., 82
- Wilson, J.C., vii, 96, 98-102; cit., 55, 77,  
  96, 97, 98, 100, 132
- Witschi, E., cit., 36, 81, 82, 83
- Wolff, Em., cit., 83
- Wolff, Et., cit., 82, 83
- Woolsey, S.H., cit., 59
- Worden, F.G., vii
- Wright, P., cit., 35
- Y chromosome, in behavioral differences,  
  50, 75, 153
- Yahr, P., cit., 26
- Yalom, J.D., cit., 57
- Yamamoto, T.O., cit., 10
- Yoshimura, F., cit., 91
- Young, W.C., cit., 6
- Zadina, J.E., cit., 18, 139
- Zebra finch, song and sex differences in  
  brain, 116-118
- Zigmond, R.E., cit., 20, 24
- Zondek, T., cit., 93
- Zucker, I., cit., 21, 23, 26, 27, 28, 29, 32,  
  106
- Zussman, J.U., cit., 57