

AUTHOR INDEX

Note: page numbers in **bold** type relate to the lists of references

- Abercrombie, D., 51, 52, 53, 71, 72, **397**
 Abercrombie, K., 254, **413**
 Abrahams, V. C., 194, **409**
 Adams, D. B., 195, **409**
 Ahrens, R., 306, 313, **418**
 Ainsworth, M. D. S., 272, **416**
 Alberti, L. B., 385, **422**
 Alexander, R. D., 119, 138, 139, 140, 142,
 143, **401**, **403**
 Allin, J. T., 213, **410**
 Allport, G. W., 257, 263, **413**
 Altevogt, R., 143, **403**
 Altman, I., 247, **415**
 Altmann, S. A., 1, 33, 34, 89, 93, 94, 107,
 108, 124, 199, 203, 282, **396**, 397, 399,
 400, **401**, **409**, **416**
 Ambrose, J. A., 241, 272, 280, 281, **410**,
 416
 Ames, L. B., 279, 280, 282, **416**
 Anderson, J. W., 272, 273, 274, 275, 276,
 279, **416**
 Andree, R., 297, **418**
 Andrew, R. J., 99, 113, 157, 177, 179,
 181, 183, 184, 185, 186, 187, 189, 190,
 191, 192, 195, 196, 197, 198, 199, 201,
 204, 205, 206, 212, 214, 217, 236, 239,
 240, 282, 283, 292, 293, 294, 295, 296,
 358, **401**, **409**, **411**, **416**
 Apel, K. O., 343, **420**
 Ardrey, R., 347
 Argyle, M., 5, 51, 55, 73, 89, 207, 243,
 244, 245, 247, 250, 252, 255, 258, 260,
 261, 262, 263, 268, 315, 344, 345, 355,
 396, **397**, **413**, **414**, **415**, **421**
 Aronson, L., 129, **399**, **406**
 Ashmole, N. P., 163, **407**
 Atz, J. W., 114, **401**
 Austin, J., 61, 75, 85, 87, **397**, **398**, **399**
 Azrin, N. H., 181, **409**
 Baccelli, G., 195, **409**
 Baden-Powell, R., 200, **409**
 Baerends, G. P., 114, 120, 212, **401**, **411**
 Bain, A., 209, **411**
 Bales, R. F., 344, **421**
 Bandura, A., **414**
 Banks, E. M., 213, **410**
 Bar-Hillel, Y., 56, 83, 84, **398**
 Barker, R. G., 266, **414**
 Barthes, R., 91, **399**
 Bastock, M., 112, **401**
 Bataille, G., 339, **420**
 Bateson, G., 217, 297, 344, **411**, **418**, **421**
 Bateson, P. P. G., 111, **401**
 Beckett, S., 359
 Bellugi, U., 40, 95, 396, **400**
 Berg, C., 338, **420**
 Berg, I., 275, 276, **416**
 Bergeijk, W. A. van, 131, **405**
 Bergson, H., 209, **411**
 Berkowitz, L., 259, **414**
 Bernal, J., 272, **418**
 Bernstein, A., 261, **415**
 Bernstein, I. S., 216, **413**
 Bertram, D. C. R., 161, 167, **407**, **408**
 Bertrand, M., 216, **411**
 Bettelheim, B., 340, **420**
 Birdwhistell, R. L., 254, 297, **414**, **418**, **419**
 Blair, W. F., 119, **401**
 Blest, A. D., 116, 121, **401**
 Blitz, J., 306, 310, **419**
 Blurton Jones, N. G., 87, 180, 183, 184,
 205, 206, 207, 212, 227, 228, 231, 232,
 241, 271, 272, 273, 274, 275, 277, 278,
 279, 280, 281, 282, 283, 285, 286, 287,
 292, 293, 294, 296, 345, **409**, **411**, **416**
 Boeckh, J., 135, **403**
 Boelkins, R. C., 226, **412**
 Bogert, C. M., 128, 129, **403**
 Bolwig, N., 212, 217, **411**
 Bonner, J. T., 150, **403**
 Bossert, W. H., 109, 135, 136, 137, **402**,
 403, **407**
 Böttger, K., 146, **403**
 Bowlby, J., 88, 274, 279, 290, **399**, **416**
 Brandt, E., 377n, **422**
 Brannigan, C., 231, 271, 277, 283, 284,
 411, **416**
 Brass, M. E., 104, **403**
 Brecht, B., 367
 Breitrose, H. S., 259, **415**
 Bremond, J.-C., 107, 153, **401**, **407**
 Bridges, K. M. B., 272, 273, 279, 287, **416**
 Brilliant, R., 381, **422**
 Bristowe, W. S., 145, **403**
 Bronowski, J., 94, 95, **400**
 Brown, J. L., 184, **409**
 Brown, R., 40, 42, 74, 79, 80, **396**, **398**
 Brun, T., 257, **414**
 Buckspan, B., 355, **421**
 Buehler, K., 374, 380n, **422**
 Buhler, C., 278, 289, **416**
 Bull, H. O., 130, **403**
 Bullock, T. H., 147, **404**

426 *Index*

- Burgess, P., 252, 414
 Buschor, E., 379, 422
 Busnel, R. G., 99, 154, 401, 406
 Butler, C. G., 135, 404
 Buytendijk, F. J. J., 209, 411
 Cameron, J. L., 355, 421
 Campbell, R., 79, 81, 398
 Cannon, W. B., 194, 409
 Capranica, R. R., 151, 404
 Carlisle, D. B., 144, 404
 Castellucci, V., 176, 407
 Chess, A., 355, 421
 Chomsky, N., 38, 40, 57, 58, 68, 69, 70,
 78, 81, 83, 84, 95, 96, 97, 122, 173, 174,
 317, 329, 395, 397, 398, 400, 401, 407, 420
 Clark, K., 391, 422
 Clark, W., 247, 415
 Cloutesley-Thompson, J. L., 144, 404
 Condon, W. S., 254, 414
 Cook, M., 247, 255, 260, 263, 413, 414, 415
 Cook, N. G., 350, 421
 Connolly, K., 273, 280, 416, 418
 Cooper, K. E., 196, 409
 Coss, R. G., 306, 419
 Cott, H. B., 129, 404
 Coulson, J. C., 163, 407
 Cranach, M. von, 300, 301, 419
 Crane, J., 144, 145, 404
 Crisp, D. J., 144, 404
 Crook, J. H., 119, 401
 Crossley, 111
 Crystal, D., 50, 51, 52, 53, 54, 82, 251,
 254, 398, 414
 Cullen, J. M., 52, 88, 89, 99, 101, 124, 125,
 177, 179, 294, 347, 358
 Currie, K. H., 271, 416
 Dante, 384
 Darwin, C. R., xii, 75, 210, 211, 216, 217,
 264, 297, 305, 311, 351, 411, 414, 419, 421
 Davenport, D., 147, 148, 404, 406
 Davitz, J. R., 251, 258, 414
 Dawe, H. C., 279, 417
 Dean, J., 250, 413
 Delco, E. A., jun., 131, 404
 Delgado, J. M. R., 107, 401
 Deonna, W., 378, 422
 Descartes, R., 343, 420
 Dietrich, G., 130, 404
 Ding, G. F., 279, 280, 282, 417
 Dingle, H., 109, 401
 Dries, W. van den, 210, 411
 Dumas, G., 209, 210, 211, 411
 Duncan, S., 295, 417
 Eibl-Eibesfeldt, I., xi, 88, 117, 127, 184,
 207, 211, 212, 213, 217, 232, 264, 297,
 298, 299, 302, 304, 305, 306, 307, 308,
 309, 312, 313, 314, 330, 344, 404, 409,
 411, 419
 Eisenberg, J., 119, 402
 Eisenstein, S., 370
 Ekman, P., 248, 249, 254, 297, 313, 349,
 351, 353, 355, 414, 419, 421
 Eldred, S. H., 251, 414
 Emerson, P. E., 272, 278, 418
 Enders, A. C., 279, 417
 Engel, J. J., 374–6, 422
 Epple, G., 213, 411
 Erikson, E. H., 305, 419
 Esser, A. H., 355, 421
 Evans, L. T., 129, 404
 Every, R. G., 275, 417
 Ewer, R. F., 213, 411
 Exline, R. V., 251, 414
 Eysenck, H. J., 353, 421
 Fairbanks, G., 288, 417
 Falls, J. B., 153, 167, 407
 Fant, G., 7, 396
 Fantz, R. L., 306, 313, 419
 Faurot, 148
 Felipe, N. J., 244, 414
 Filarete, 385, 422
 Firth, R., 123, 331, 346, 420
 Fodor, J. A., 329, 420
 Foley, J. P., 217, 411
 Fox, M. W., 236, 411
 Franck, D., 111, 402
 Frazer, Sir J. G., 323
 Freedman, D. G., 272, 417
 Freeman, T., 355, 421
 Freud, S., 209, 344, 411, 420
 Friedman, M., 102, 402
 Friesen, W. V., 254, 297, 312, 355, 414, 419
 Frijda, N. H., 209, 210, 231, 297, 411, 419
 Frings, H., 1, 99, 143, 147, 396, 401, 404
 Frings, M., 1, 99, 143, 147, 396, 401, 404
 Frisch, K. von, 108, 111, 115, 117, 130,
 132, 134, 135, 137, 402, 404, 405
 Frishkopf, L. S., 151, 404, 405
 Froloff, J. P., 130, 405
 Galanter, E., 260, 290, 415, 417
 Galloway, T. W., 147, 405
 Galtsoff, P. S., 146, 405
 Gardner, B. T., 27, 33, 36, 39, 41, 42, 43,
 44, 47, 69, 79, 80, 288, 319, 397, 417
 Gardner, R., 297, 419
 Gardner, R. A., 27, 33, 36, 39, 41, 42,
 43, 44, 47, 69, 79, 80, 319, 397
 Garfinkel, H., 243, 414
 Gajdussek, D. C., 207, 298, 420
 Gewalt, W., 213, 411
 Gewirtz, J. L., 238, 412

Index 427

- Gibson, J. J., 164, 407
 Gimson, A. C., 82, 398
 Goethe, F., 211, 412
 Goethe, J. W., 387, 422
 Goffman, E., 243, 253, 266, 350, 366, 367,
 414, 421, 422
 Goldstein, M. H., jun., 151, 405
 Gombrich, E. H., 207, 346, 373, 374, 377,
 380n, 382, 384, 393, 394, 420
 Goodall, J., 218, 412
 Goody, E., 238
 Goswell, M. J., 226, 412
 Gould, J. E., 135, 405
 Grant, E. C., 207, 212, 231, 232, 269, 271,
 274, 275, 276, 277, 283, 284–5, 286, 287,
 288, 293, 349, 352, 353, 412, 417, 421
 Graves, T. D., 247, 264, 416
 Gray, D., 414
 Greenberg, J., 78
 Gregory, R., 422
 Grice, H. P., 75, 398
 Groenewegen-Frankfort, H. A., 377, 422
 Grzimek, B., 217, 412
 Guilford, J. P., 229, 412
- Haggard, E. A., 249, 414
 Hailman, J., 110, 402
 Hake, D. F., 181, 409
 Haldane, J. B. S., 109, 402
 Hall, K. R. L., 226, 412
 Hall-Craggs, J., 160, 174, 407
 Halle, M., 342, 344, 420
 Halliday, M. A. K., 59, 72, 73, 83, 85, 398
 Hallpike, C. R., 331, 338, 420
 Hamilton, W. J., 106, 127, 133, 136, 406
 Hamming, R. W., 9, 396
 Hammond, J. M., 288, 417
 Hampshire, S., 343, 420
 Harris, C. G., 131, 405
 Hartmann, P., 78
 Hartshorne, C., 175, 407
 Hasler, A. D., 130, 405
 Hass, H., 298, 304, 419
 Hattwick, M. S., 287, 417
 Hayes, C., 35, 397
 Hayes, K. G., 35, 397
 Hayworth, D., 209, 210, 211, 412
 Hazlett, B. A., 109, 402
 Hebb, D. O., 46, 397
 Heider, K. G., 297, 419
 Held, R., 97, 400
 Henerey, M., 135, 405
 Hepp-Raymond, M.-C., 130, 407
 Herbert, E. C., 288, 417
 Herbert, J., 201, 410
 Herrnstein, R. J., 39, 397
 Herter, K., 213, 412
 Hess, E. H., 306, 419
- Hetzer, H., 278, 289, 416
 Hilton, S. M., 194, 195, 409
 Hinde, R. A., 15, 87, 88, 96, 97, 110, 112, 113,
 116, 118, 127, 153, 177, 178, 180, 182, 187,
 197, 292, 396, 400, 402, 405, 407, 409,
 417
 Hjelmslev, L., 78, 398
 Hockett, C. F., 1, 27, 28, 33, 34, 36, 49,
 54, 66, 71, 74, 91, 93, 94, 95, 133, 396,
 397, 398, 400, 405
 Hoesch, W., 213, 412
 Hogarth, W., 392
 Honikman, B., 71, 398
 Hooff, J. A. R. A. M. van, 88, 198, 180,
 207, 209, 212, 213, 214, 215, 216, 217,
 218, 219, 220, 222, 224, 225, 226, 227,
 228, 231, 232, 236, 238, 239, 240, 280,
 281, 301, 302, 308, 345, 409, 412, 417,
 419
 Hooker, B. I., 161, 407
 Hooker, T., 161, 407
 Horn, G., 186, 206, 409
 Horridge, G. A., 147, 404
 Householder, F. W., 78, 84, 398
 Hull, C. L., 87, 400
 Humbertotova, A., 163, 407
 Humphries, D., 231, 271, 277, 283, 284,
 411, 416
 Hunsperger, R. W., 184, 409
 Hunsaker, D., 105, 106, 119, 402
 Hutchinson, J., 167, 408
 Hutchinson, R. E., 166, 167, 407, 408
 Hutchinson, R. R., 181, 409
 Hutt, C., 269, 355, 414, 421
 Hutt, S. J., 269, 414
 Huxley, J. S., vii, 116, 127, 402, 405, 420
 Hymes, D., 60, 398
- Immelmann, K., 105, 402
 Ingham, R., 247, 250, 413, 415
 Isaacs, K. S., 249, 414
- Jakobson, R., 323, 342, 344, 420
 Janitschek, H., 385, 422
 Jecker, J. D., 259, 415
 Jersild, A. T., 279, 280, 282, 417
 Johnson, D. L., 134, 135, 405, 406
 Jourard, S. M., 247, 415
 Justine, F., 280, 417
- Kaissling, K.-E., 135, 403
 Kandel, E., 176, 407
 Kant, I., 210, 412
 Katz, J. J., 329, 420
 Kaufmann, J. H., 213, 412
 Kawai, I., 231, 412
 Keene, G. C., 289, 418
 Kehrer, H. E., 275, 276, 417

428 *Index*

- Kenderdine, M., 279, 280, 417
 Kendon, A., 245, 247, 255, 256, 260, 263,
 413, 415
 Kiley, M., 193, 198, 199, 201, 410
 Kleerekoper, H., 130, 405
 Knowles, F., 144, 404
 Koch, H. L., 276, 417
 Koenig, O., 306, 419
 Koestler, A., 209, 210, 211, 412
 Kohts, N., 217, 412
 Konishi, M., 158, 407
 Kris, E., 38on
 Kupperman, I., 176, 407
- La Barre, W., 310–11, 346, 419, 420
 Labov, W., 60, 398
 Lacey, J. I., 410
 Lack, D., 119, 154, 402, 407
 Lade, B. I., 158, 407
 Ladefoged, P., 59, 398
 Lahiri, R. K., 216, 411
 Lalljee, M. G., 255, 260, 413
 Landreth, C., 277, 278, 279, 417
 Lane, M., 332, 420
 Lanyon, W. E., 139, 140, 141, 405
 Laroche, J. G., 237, 238, 412
 Lasher, E. P., 195, 410
 Lassman, F. M., 288, 417
 Laver, J. D. M., 51, 52, 59, 71, 72, 78, 82,
 398
 Lawick-Goodall, J. van, 218, 221, 302,
 412, 419
 Leach, E. R., 90, 124, 207, 312, 313, 315, 323,
 338, 346, 347, 394, 420
 Leach, G. M., 273, 274, 275, 277, 278,
 282, 416, 417
 Le Brun, C., 379
 Lefcourt, H. M., 355, 421
 Lehr, E., 40, 397
 Lehrman, D. S., 96, 102, 399, 400, 402
 Lennard, H. L., 261, 415
 Lenneberg, E. H., 63, 77, 78, 79, 81, 84, 95,
 398, 399, 400
 Leonardo da Vinci, 385, 422
 Lersch, P., 209, 412
 Leslie, C. J., 147, 405
 Lévi-Strauss, C., 91, 317, 341–2, 344, 347,
 400, 420
 Leyhausen, P., 198, 239, 410
 Lill, A., 105, 402
 Lind, J., 286, 418
 Lindauer, M., 133, 135, 405
 Lindblom, B., 7, 396
 Lipps, Th., 209, 210, 412
 Lissmann, H. W., 130, 131, 405
 Lister, R., 392, 423
 Little, B. R., 261, 263, 413
 Lloyd, J. E., 140, 405
- Loizos, C., 108, 217, 218, 239, 313, 402,
 412, 413
 Lomazzo, G. P., 379
 Lorenz, K. Z., 110, 239, 288, 306, 308, 338,
 344, 402, 417, 419, 420
 Lott, E. E., 247, 415
 Loveland, D. H., 39, 397
 Lutz, B., 129, 405
 Lyons, J., 1, 17, 27, 31n, 49, 60, 65, 68,
 73, 75, 84, 85, 87, 88, 90, 91, 92, 95,
 97n, 107, 122, 124, 251, 254, 268, 317,
 318, 319, 320, 322, 328, 331, 399,
 400
- McCleary, R. A., 106, 410
 Maccoby, N., 259, 415
 McComas, H. C., 210, 413
 McGhie, A., 355, 421
 McGrew, W. C., 212, 274, 276, 277, 278,
 279, 280, 285, 413, 417
 McHenry, R., 244, 413
 McIntosh, A., 59, 398
 MacKay, D. M., 1, 3, 8, 11, 12, 15, 16, 17,
 20n, 77, 86, 87, 88, 89, 90, 101, 102,
 108, 109, 112n, 122, 124, 268, 290, 291,
 296, 322, 345, 347, 396, 417
 McKinney, F., 103, 402
 MacLean, P. D., 314, 420
 MacLeod, M. C., 135, 405
 McLuhan, M., 369
 McPhail, P., 267, 415
 Mahl, G. F., 269, 415
 Måle, E., 387, 423
 Malinowski, B., 73, 331, 399, 420
 Mancia, G., 195, 409
 Manning, A., 111, 402
 Marler, P., 93, 102, 106, 118, 127, 133,
 136, 155, 156, 167, 175, 176, 400, 402,
 406, 408
 Marshall, J. C., 71, 75, 77, 78, 79, 399
 Martinet, A., 65, 399
 Matthews, P. H., 66, 83, 84, 94, 399
 Mauro, T. de, 343, 421
 Mayr, E., 118, 402
 Mead, M., 297, 418
 Means, L. W., 184, 202, 410
 Mehrabian, A., 248, 415
 Mellers, P. S., 144, 404
 Melnechuk, T., 1, 396
 Michael, G., 278, 417
 Michael, R. P., 201, 410
 Michelson, A., 139, 406
 Michener, C. D., 134, 406
 Miller, G. A., 260, 290, 415, 417
 Miller, J., 207, 359, 394
 Miller, N. E., 87, 97, 400
 Mischel, W., 263, 267, 415
 Mitchell, J. C., 275, 417

Index 429

- Mogensen, J. A., 130, 405
 Montagna, W., 196, 197, 410
 Montagu, J., 379, 423
 Montagu, M. R. A., 308, 419
 Moravscik, J., 399
 Morris, C., 70, 74, 92, 399, 400
 Morris, D., 116, 117, 264, 281, 331, 347,
 402, 418, 421
 Moulton, J. M., 151, 406
 Mowrer, O. H., 38, 397
 Moynihan, M., 180, 410
 Murray, H. A., 380, 423
 Neal, E., 200, 410
 Needham, R., 344, 421
 Nelson, J. B., 116, 402
 Neumann, G., 378, 423
 Nicholson, H., 252, 414
 Nicolai, J., 121, 160, 402, 408
 Noble, G. K., 129, 406
 Nordenfalk, C., 391, 423
 Norris, K. S., 147, 148, 404
 North, M. E. W., 160, 408
 Nottebohm, F., 158, 176, 408
 Ogston, W. D., 254, 414
 Oldfield, R. C., 20
 Ortega y Gasset, J., 372, 422
 Osgood, C. E., 87, 277, 400, 418
 Osman Hill, W. C., 216, 413
 Otte, D., 119
 Ounstead, C., 355, 421
 Pantin, C. F. A., 47, 397
 Parry, D. A., 146, 406
 Parsons, T., 344, 421
 Partanen, T., 286, 418
 Pearson, M., 181, 199, 410
 Peirce, C. S., 70, 84, 399
 Pfuhl, E., 379, 423
 Piaget, J., 79, 80, 81
 Pike, K. L., 83, 399
 Pinsker, H., 176, 407
 Plato, 393
 Plessner, H., 209, 211, 212, 227, 413
 Plooij, D., 1, 107, 396
 Plooij, D. W., 306, 310, 314, 419, 420
 Plooij, F., 306, 310, 419
 Pohl, A., 213, 413
 Porter, E. R., 247, 415
 Premack, D., 45, 46, 47, 397
 Pribram, K. H., 260, 290, 415, 417
 Price, D. B., 251, 414
 Price, H. H., 47
 Pride, J. B., 60, 399
 Quine, W. V., 74, 399
 Quirk, R., 58, 399
 Radcliffe-Brown, A. R., 97, 238, 313, 400,
 413
 Ramsay, A., 91, 93, 400
 Reynolds, F., 221, 413
 Reynolds, V., 221, 413
 Rheingold, H. L., 289, 418
 Richards, M. P. M., 272, 418
 Roberts, W. W., 184, 202, 203, 410
 Robins, R. H., 83, 399
 Robson, K. S., 272, 282, 418
 Rohlf, F. J., 134, 407
 Rosenblatt, J. S., 110, 399, 402
 Rosenfeld, H. M., 259, 415
 Ross, D. M., 147, 406
 Rotenburg, F., 355, 421
 Ruesch, J., 344, 421
 Rushmer, R. F., 195, 410
 Ryle, G., 364, 422
 Sahlins, M. D., 259, 415
 Salter, V., 247, 252, 414, 415
 Schäffer, H., 376, 423
 Schaffer, H. R., 272, 278, 418
 Schefflen, A. E., 243, 254, 415
 Schenkel, R., 114, 117, 199, 308, 402, 410,
 420
 Schloeth, R., 226, 413
 Schneider, D., 135, 151, 403, 406
 Schneirla, T. C., 92, 110, 400, 402
 Schuette, D., 414
 Schulze, G., 269, 415
 Schutz, W. C., 261, 415
 Schwartzkopff, J., 171, 408
 Searle, J. R., 75, 85, 399
 Sebeok, T. A., 91, 92, 99, 101, 110, 142,
 143, 145, 179, 268, 394, 395, 400, 401,
 402, 406, 410
 Shaffer, B. M., 150, 406
 Shaftesbury, 3rd Earl of, 376, 423
 Shakespeare, W., 371
 Shannon, C., 7, 8, 9, 10, 125, 396
 Sidis, 211
 Sissons, M., 245, 415
 Skinner, B. F., 50, 329, 399, 421
 Smith, A. G., 70, 399
 Smith, H. L., 65, 399
 Smith, M., 128, 406
 Smith, O. A., 195, 410
 Smith, P., 273, 280, 416, 418
 Smith, W. J., 108, 123, 153, 205, 403, 408
 Sokolov, E. N., 186, 189, 196, 206, 410
 Sommer, R., 244, 247, 414
 Sorenson, E. R., 297, 298, 312, 419, 420
 Southwick, C. H., 216, 412
 Spencer, H., 210, 211, 413
 Spivak, H., 215, 226, 413
 Spurway, H., 109, 402
 Steffy, R. A., 355, 421

430 *Index*

- Steinberg, M. L., 184, 202, 410
- Stengel, E., 350, 421
- Stevens, P. D., 59, 398
- Stevenson, J. R., 15, 87, 167, 396, 400, 407, 408
- Stokes, A. W., 104, 403
- Stout, J. F., 104, 131, 403, 406
- Strang, B. M. H., 59, 399
- Strawson, P. F., 75, 362, 399, 422
- Struhsaker, T. T., 93, 400
- Szasz, T. S., 257, 415
- Tagiuri, R., 258, 415
- Tagliacozzo, G., 421
- Tavolga, W. N., 1, 92, 93, 131, 139, 140, 141, 395, 396, 400, 405, 406
- Tcheng, F., 237, 238, 412
- Tente, D., 275, 276, 417
- Testelin, H., 388, 423
- Teuber, H.-L., 46, 173, 397
- Thielcke, G., 119, 160, 403, 408
- Thompson, J., 272, 418
- Thompson, T. I., 185, 410
- Thompson, W. H., 46, 397
- Thorpe, W. H., 1, 7, 22, 27, 46, 47, 49, 52, 54, 69, 93, 95, 99, 101, 109n, 110, 118, 123, 124, 127, 135, 147, 153, 155, 156, 158, 159, 160, 161, 163, 164, 167, 168, 170, 171, 264, 319, 396, 397, 400, 406, 407, 408
- Tinbergen, E., 358
- Tinbergen, N., 88, 103, 104, 105, 111, 112, 114, 127, 177, 179n, 180, 181, 190, 292, 294, 295, 329, 358, 401, 403, 406, 410, 418, 421
- Toback, E., 399
- Tolman, E. C., 87, 400
- Tolstoi, L., 368
- Trager, G. L., 65, 399
- Trollope, J., 294, 416
- Tschanz, B., 164, 408
- Tugendhat, B., 292, 418
- Turner, V. W., 344, 421
- Valanne, E., 286, 418
- Van Gennep, A., 339, 421
- Vernon, J. A., 130, 407
- Vernon, P. E., 263, 413
- Verplanck, W. S., 260, 415
- Vine, I., 249, 272, 277, 416, 418
- Vuorenkoski, V., 286, 418
- Waddington, C. H., 114, 403
- Wain, J., 371, 422
- Wales, R. J., 79, 81, 398
- Wallach, L., 288, 417
- Washburn, R. W., 237, 283, 413, 418
- Wasz-Hockert, O., 286, 418
- Watson, O. M., 247, 264, 416
- Welford, A. T., 87, 400
- Wells, P. H., 134, 407
- Welsh, J. H., 146, 406
- Welsh, P. S., 147, 405
- Wenner, A. M., 134, 135, 406, 407
- Wever, E. G., 130, 407
- White, H. V., 421
- White, R. E. C., 168, 170, 171, 408
- White, S. J., 168, 169, 170, 171, 408
- Whitehead, A. N., 47
- Wickler, W., 101, 114, 116, 119, 120, 306, 307, 308, 310, 314, 403, 419, 420
- Wiepkema, P. R., 181, 184, 410
- Wiley, J. H., 288, 417
- Willett, J., 367, 422
- Williams, J. H., 260, 416
- Williams, M., 252, 258, 414
- Willis, F. N., 278, 417
- Wilson, E. O., 109, 135, 136, 137, 138, 403, 407
- Winters, L. C., 251, 414
- Wisby, W. J., 130, 405
- Wittgenstein, L., 359, 422
- Wolff, P. H., 272, 418
- Wolff, S., 355, 421
- Wood-Gush, D., 105, 402
- Wortis, R. P., 104, 403
- Wright, H. F., 266, 414
- Xenophon, 379, 423
- Yerkes, R. M., 217, 413
- Zanchetti, A., 195, 409
- Zbrozyna, A., 194, 409

INDEX

ABBREVIATION: NVC = *non-verbal communication*

- abnormality: responses to, 349–50; symbolic expression of, 336, 337
- abstraction: art as an exercise in, 373; by insects, 115
- Acanthomyops* (ant), pheromone of, 136, 137
- accent, 59, 72; lexical and non-lexical, 82–3
- Acheta* (field cricket), sound signals of, 140
- acrasin, in aggregation of slime moulds, 150
- Acris* (cricket frog), mating calls of, 151
- actors, NVC by, 360, 362–4
- adaptation, phylogenetic, 306
- advertisements, NVC in, 392, 393
- Aedes* (mosquito), wing-beat frequency of, 112
- affectation, behaviour symbolising, 316
- affective function of language, *see also* attitudinal
- affinitive categories of behaviour, 221, 222, 223, 231; association of smiling with, 229, 230, 235; questionnaire on associations of words with, 228–9
- affirmation, signals of, 303–5, 333–5
- Africans, NVC between, 246
- age (social), symbolism of, 337–8
- aggressive categories of behaviour, 202, 221, 222, 223, 227; between children, 283–6; bias away from, in schizophrenics, 354; conflict between flight and, in displays, 177–8, 179–81; laughter and, 211, 229–30, 239; phallic display in, 307; questionnaire on associations of words with, 227–8; signals of, in birds, 104–5, in insects, 138, and in spiders, 145
- alarm signals, 102; of birds, 32, 93, 118, 154–7; of fishes, 130; of insects, 137, 138
- alert responses, 113, 186, 188–9, 191
- Alligator*, territorial defence by, 129
- Alpheidae (snapping shrimps), sound signals of, 144
- ambivalent situations, 357–8
- American Sign Language, 33, 36–7, 257; teaching of, to chimpanzee, 29, 37–45, 319
- Americans, NVC between, 247
- amines, detection of, by fishes, 130
- Amphibia, communication in, 127–9
- Amphiprion* (fish), acclimation of sea anemone to, 148–50
- anecdotal painting, 391–2
- anger, in different cultures, 345
- animals: communication in, 21–2, 92–3, 101–25, 374; origins of human behaviour in, 75–7, 94–5, 173–4, 345; social behaviour of humans and of, 264–5; vocal communication in humans and in, 27–47; *see also individual groups and species*
- Annelida, communication in, 146–7
- anthropology, social: and ethology, 328–33, 347; methodology of, 346–7
- anthroposemiotic systems, 91–2, 268
- ants, chemical communication in, 109, 135–7
- appeasement actions, 113–14
- Arabs, NVC between, 246, 247, 264
- Arachnida, displays by, 30, 144–6
- arbitrariness (symbols abstract): in American Sign Language, 36; in vocal communication, 28–9, 31, 54
- arms-raised posture, in children, 274, 277
- arthropodin, and settlement of barnacles, 144
- arts, visual, xi, 91, 373–4; action and expression in, 374–6; alternative functions of, 391–2; chorus effect in, 382–4; dehumanisation of, 372; expression and emphasis in, 384; inwardness and ambiguity in, 388–90; legibility in, 374, 376, 381; narrative and interpretation in, 378–81; pictographic style in, 381–2, 383, 384, 386; representational grammar in, 367–8; symbolic and expressive gestures in, 376–8, 381, 387, 394
- associativity, in syntax, 67, 68
- Atta* (ant), pheromone of, 136
- attentiveness, signalled by listener, 255–6
- attitudinal or social function of language, 55, 72, 73
- autistic children, 355, 358
- automanipulation, by children, 275
- automata, theory of, 7
- autonomic responses, 113, 194–9
- aversive behaviour, as response to abnormality, 349–50
- babbling: of birds, 175; of human baby, 37–8, 79, 273, 286, 287; manual, of chimpanzee learning sign language, 38
- babies: crying by, 279; head-shape of, 288; smiling by, 212, 236–8, 271; *see also* babbling
- baboons: calls of, 118, 192; eyebrow-lifting in, 301; yawning in, 202, *see also Theropithecus*
- badger (*Meles*), scent signals of, 200

432 Index

- Bali, NVC in, 299, 303, 308
 bared-teeth display, *see grin-face*
 barnacles, settlement of, 144
Bathygobius (goby), grunts of, 131
 bees: colony odour of, 108, 137; communication between by dancing, 28, 94, 132–5, (amount of information conveyed by) 109, (different forms of) 117–18, (in different species) 111, (evolution of) 115, (in swarming) 108, 133, (wing-beat frequency in) 134
 behaviour: all potentially informative, 4; internal organisation of, 5; sequences of, more rigid in the mentally ill, 354; social, 89, 90, 264; units of, 219–25, 292–3, 352; *see also* goal-directed behaviour
 behaviourists, gulf between linguists and, 329
Betta (Siamese fighting fish), display by, 185
 binary concept (basic structural opposition), 9, 333, 334
 bird song, 30, 33, 157–8; design features in, 174; imitativeness in, 53–4, 161–2; learning of, 158–61; musicality of, 174–5; mutual recognition of, 162–72
 birds: complexity of communication in, 99; mobbing by, 155, 182–3, 187, 205; navigation by, 94; perception of sound by, 171, 172, 173; purposiveness of communication by, 47; vocal communication in, 153–4, 172–4, (alarm calls) 32, 93, 118, 154–7, (call notes) 30–1, 154, 191 (song) *see bird song*
 ‘bits’ (binary digits), measurement of selective information content in, 9
 blackbird (*Turdus*): alarm calls of, 155, 156; learning of song, by, 160; in mobbing of owl, 182, 183; ‘musicality’ of song of, 175
Bleennius (blenny), olfactory sensitivity of, 130
 blindness, in humans, 272, 299, 304, 305, 345
 body: adornments of, 327, 338, 343; contact of, with body of another, 202, 246–7; movements of, (in art) 385–7, (in NVC) 246–50, 260, 263, (in ritual) 327, 343; position of, in positive or negative reaction to external object, 375
Bombus (bumble bee), pheromone of, 136
Bombyx (silk moth), pheromone of, 102
 Braconid wasps, wingbeat frequency in, 112
 brain: behaviour after lesions of, 195–6; lateralisation of control of bird song and human speech in, 176; localisation of language functions in, 77–8; telemetric stimulation of electrodes in, 107; *see also hypothalamus*
 breeding status, and scent signals, 201
 broadcast transmission, of vocal communication, 28–9, 30
 buccal pad, of children 288
 bullfinch (*Pyrhula*), learning of song by, 160
 buntings, vocal communication in, 29
 butterflies, ocelli on wings of, 121
Cacajao (uacari), flushing of skin of, 196–7
Calliactis (sea anemone), and shell of hermit crab, 147–8
 camera with angle lens, for recording behaviour, 298
 canary (*Serinus*): learning of song by, 159; songs of other species fostered by, 157, 160
 Canidae: bending of vertebral column in, 193; non-vocal communication in, 29; purposiveness of communication in, 47; *see also* dog
 cardiovascular changes, preceding exertion, 194–5
 carnivores, bared-teeth display in: silent, 236; vocalised, 213
 cat: postural tonus in, 198; pupil dilation in, 188; rolling induced by catmint in, 204; threat display of, 184, 194–5, 203
 cattle: sweating in, 196; tail-elevations of, 198
 centipedes, sounds produced by, 146
 Cephalopoda, visual displays in, 146
Cercocetus (mangabey), excitement behaviour of, 194
Cercopithecus (guenon): bared-teeth display in, 215; bobs of, 193; calls of, 118; grin-face and play-face in, 237
 chaffinch (*Fringilla*): alarm calls of, 155, 156, 157; in mobbing of owl, 182; song of, 153, 158–9, 160; submissive postures in, 197
 channel, in communication engineering, 34, 63, 92
 chemical communication, 30, 92, 110, 138; in Amphibia, 127, 128; in ants, 109, 135–7; in Arachnida, 145; in Crustacea, 144; in fishes, 130, 137; in Mollusca, 146; in moths, 102, 138, 150–1; in slime moulds, 150; *see also* scent-marking
 cheremes, in sign language, 36
 children: acquisition of language by, 37, 40, 63, 76, 78, 79, 80, 81; autistic, 355, 358; comparison of language performance of chimpanzees and of, 42, 44–5, 95; NVC by, 271–2, 290–6, (neglected areas of) 286–90, (in second year) 272–6, (in two-

Index 433

- children (*cont.*)
 to five-year-olds) 277–86; NVC by adults to, 289–90
- chimpanzee (*Pan*): calls of, 118, 192; comparison of language performance of children and of, 42, 44–5, 95; correlation coefficients of behaviour units of, 219–25; grin-face in, 215, 219, 221–4, 225; kissing by, 302; lip-smacking by, 216; play-face in, 108, 173, 219, 225, 233; teaching of languages to, (American Sign Language) 29, 37–45, 319, (English) 35–6, 41, 79, (token) 45–6
- China, theatre in, 367
- choice, by sender of signal, 71, 72–3, 87
- chorus effect, in art, 382–4
- choruses, among animals, 192, 240
- cicadas, sound signals of, 139
- Cichlidae, concealed and open nests of, 119–20
- cinema, and NVC in theatre, 369–72
- citral, ant pheromone, 136
- citronellal, ant pheromone, 136
- clothes, xii, 91; in self-presentation, 248; in signalling social age, 338
- code, in communication engineering, 9, 92
- cognitive development, and speech, 79, 81
- cognitive (ideational) function of language, 55, 73
- Colobus* (monkey), calls of, 118
- colonies of bees and ants, individual odours of, 108, 137
- colour: change in, as response to signal, 102; patterns of, as signals, 130
- Columbidae, songs of, 157–8
- 'comics', children's, 374, 392
- communication, 1, 3–6, 23–5, 86–90; agent in, 21–3; between organisms, 16–21; classification of, 90–2; complexity of, 92–4, 99; language not always, 49, 71; mathematical theory of, 7–11, 109, 124–5; organisation of action by, 11–16; principles of in animals, 101–25
- communication engineering, 4, 25; factors in, 92; measurement of information flow in, 7–9; tools of, 6–7
- commutativity, in syntax, 67–8
- concatenation, in language, 68
- conceptualisation, 173; by chimpanzee, 39, 40; by pigeons, 39–40
- conditioning: of display in *Betta*, 185; operant, for greeting grins, 191
- conflict of drives or tendencies: in displays, 112, 113, 177–8, 179–85, 204–5, 292–6; in smiling and laughter, 239–40
- conscious experience, of evaluation of competing criteria, 14
- context: in animal communication, 108, 122–4; in art, 374, 376, 380, 394; in communication engineering, 92; cultural, in human NVC, 315–47; difficulties of defining, 123; facial expression and, 370; and reception of bird song, 154; of utterances, situational and linguistic, 60–1, 83
- contradiction, between different components of an utterance, 61–2, 83
- control-systems approach to study of behaviour, 88, 89, 290–2, 296
- copulatory signals: in insects, 138; in mammals, 203
- courtship displays, 112, 114, 177–8, 179–81
- courtship signals: in closely related species, 118–19; in insects, 138
- Crassostrea* (oyster), egg-releasing chemical in sperms of, 146
- crickets: calling songs of six sub-families of, 141; sound communication in, 28, 119, 139, 140
- Crocodilus*, territorial defence by, 129
- Crotalus* (rattlesnake), sound signal of, 129
- Crotaphytus* (lizard), vocalisation by, 129–30
- crows, vocal communication in, 29
- Crustacea; signals of, 143–4,
- crying: by adults, 330, 331–2; by children, 191, 278–9, 286, 293; in different cultures, 345
- Cuculus* (cuckoo), song of, 158
- cultural competence, 321–2
- cultures: fallacy of reifying, 97–8; influence of context of, in human NVC, xii, 315–47; similarities and differences in behaviour between, 299–304
- cutaneous secretion, in mammalian displays, 199–201
- Cynopithecus* (Celebes ape): grin-face of, 190, 215, 216, 226, 236; play-face of, 236
- deafness: and facial expressions, 299, 305, 345; and learning of bird song, 158–9; and speech, 158
- death, rituals at, 340
- death-rebirth symbolism, 340
- decorum, in art, 387–8
- defaecation, in displays, 200–1
- deixis, in language, 73–4, 85
- denial, signals of, 303–5, 333–5
- desiderative signals, 74
- design features of communication, 1, 28–34, 93–4; in bee dance, 133–4; in bird song, 174, 176; in different phyla, 28–9, 95; grouping of, 34–5; in human language, 28, 54, 174
- destination, in communication engineering, 92

434 Index

- development, *see* ontogeny
- dialect, 59
- Dicrurus* (drongo), mimicry by, 161
- Didelphis* (opossum), defensive threat in, 184
- digital coding system of information, in verbal language, 31
- directional reception, of vocal communication, 28–9, 30
- discreteness, in vocal communication, 28–9, 31–2, 54
- displacement (references of signals to things remote in time and space): in bee dance, 134; in vocal communication, 28–9, 32, 54
- displacement activities, 112–13, 275
- displays: causation of, 112–13, 177–204, 292, 294–5; evolution of, 112–15, 296; by mammals, 179–85, 203–6; response groupings in, 185–203; ritualisation in, 115–20, 177, 294; *see also* courtship displays, territorial defence, threat displays, etc.
- dog: cardiovascular changes preceding exertion in, 195; facial expressions of, 184; tail-wagging by, 193, 295–6
- domestic fowl (*Gallus*): displays by, 105, 114–15, 117; shaking responses in, 201; vocal signals of, 158, 186, 191
- dominance: in different cultures, 346; grin-face in, 215; sequences of behaviour symbolising, 316; in schizophrenics, 355, 356, 357; signal markers of, 335–7; teeth-chattering and, 215–16; *see also* peck order, status
- doves, song of, 28, 157–8
- 'drive', conflicts described in terms of, 112–13, 178, 180, 182, 183, 292–5, 375
- Drosophila*: genes affecting communication in, 111; wing-beat frequency of, 112
- duality of patterning (signal elements meaningless, pattern combinations meaningful): difficulties in concept of, 93; in human language, 53, 54, 58, 65–7, 91; in vocal communication, 28–9, 33
- ear, movements of, 183, 188, 189–90
- effector system, in information flow, 12, 13, 14, 15
- ego, breakdown of boundary of, 355
- Egypt, ancient: art of, 374, 376–7
- eider duck (*Somateria*), displays by, 103
- electric signals, of fishes, 130–1
- embarrassment, 302
- embracing, in greeting, 302
- emergency reaction, 194
- emotions: in art, 393; control of expression of, 244, 249; in facial expressions, 379, 380; in gestures, 249; in NVC, 251, 253; NVC interpreted in terms of, 258; physiological reactions to, 329–30; recognition of, 231, 259, 264
- empathy: degree of, expected and aroused by art, 378
- England, NVC in, 246, 247
- environment, communication of information about, 93
- epilepsy, 352
- equilibrium processes, in social interaction, 261
- eroticism, rules of taboo and, 339
- errors in signalling, detection of, 9
- Estrildine birds, hosts to parasite Viduines, 120–1
- ethologists, as linguists working with non-verbalising species, 173
- ethology, social anthropology and, 328–33, 347
- Eupagurus* (hermit crab), attachment of *Calliactis* to shell of, 147–8
- etiquette books, 243
- evaluation: in communication, 11, 12, 13, 291; in distinction between emission or reception of information, and communication, 18–19, 21, 22; in meta-organising system, 15, 18; priorities in, 14
- evolution: of animal communication, 111–22; of language? 75–7, 94–5, 173–4; of NVC, 264–5
- evolutionist, focus of interest in behaviour for, 89
- excitement categories of behaviour, 194, 221, 223, 224
- excretions, symbolic uses of, 328
- exertion: continuum from immobility to, 195–6; reflex changes preceding, 194–5
- experience, and response to signals, 110–11
- experiments, on animal communication, 104–5
- eyebrows, movements of, 258; in children, 288, 291, 293; 'flash' of, xi, 299–301; raising of, 188, 300–2
- eyes: closing of, 189; reflex of pupil of, 13–14, 188; pattern of, as protective device, 306
- Eylais* (water-mite), tactile communication in, 146
- face, expressions of: in art, 380, 388–9, 391; in children, 272; in cinema, 369–70; continuously graded, 32; modulation of verbal communication by, 261; in NVC, 244, 249, 258, 351; in protective responses, 189, 190; response of children to, 277–8, 282; in ritual, 328; *see also* grin-face, play-face

Index 435

- factor analysis, of behaviour in displays, 181
- facts: adjustment of behaviour to, 5; internal representation of, 16–17
- fading, of vocal communication, 28–9, 30
- family, social interaction within, 262
- feathers, erection of, 197, 203
- feature filter systems, sensitive to particular aspects of sensory input, 16
- feedback: acoustic, in learning of bird song, 158–9, 175; automatic mechanisms for, 13–14; complete, in vocal communication, 28–9, 31; from listener to speaker, 251, 255, 258, 260; by natural selection, 21–3; negative, in organisation of behaviour, 12
- feedforward: from sense organs, to keep repertoire of control patterns up to date, 15, 16
- Felidae, bending of vertebral column in, 193; *see also* cat
- fiction, and NVC in theatre, 368–9
- films, recording of social behaviour on, 297–9, 312, 330; *see also* cinema
- finches, vocal communication in, 29; *see also under individual species*
- fireflies (*Photinus*), flash signals of, 140, 142–3
- fishes: banding patterns of, 102, 120; ‘cleaner’, 101; communication in, 119–20, 130–1, 137, 151; symbiotic with sea anemones, 147, 148–50
- fixed action pattern, 179n, 180
- flight, 203; bias of behaviour towards, in schizophrenics, 353, 354, 356–7; conflicts between aggression and, in displays, 177–8, 179–81; protective responses and, 189
- flirting, in different cultures, 300, 302–3, 345
- floor-apportionment for speakers, NVC and, 249, 255, 258, 273
- food: calling to, in courtship displays of birds, 114–15, 117; normal response to, by prey, parasitised by angler fish, 120; symbolic aspects of, 91, 328, 340–2
- form: patterns of, as signals, 130
- friendship groups, social interactions within, 262–3
- frogs (*Rana*): calls of, 128–9; specificity in responsiveness of, 151
- frustration: and aggression, 181; tests for, in children, 276
- Galago*: defensive threat in, 194; mobbing calls of, 192
- gannet (*Sula*), landing calls of individuals, 168–71
- garden warbler, alarm call of, 155
- gaze: in the mentally ill, 354, 355; in NVC, 245, 249–51, 256, 265; and status, 252; in threat, 286, 300
- geckos, vocalisations by, 129–30
- genetic code: acquired characters in, 114; capacity to acquire language in, 96, 343; and communication system in *Drosophila*, 111; as semiotic system possessing duality, 93
- genital presentation (phallic display), 116, 306–10, 314
- gesture languages, *see sign languages*
- gestures: in art, 376–8, 381, 384, 394; of children, 273–6, 278; in different cultures, 330, 387; in learning a language, 317; in NVC, 249; in ritual, 327; and verbal communication, 91, 361
- gibbon (*Hylobates*): song of, 192; teeth-chattering display by, 217
- gnawing, in play, 217, 219, 226
- goal-directed behaviour, 6, 11–16, 86, 87, 290–2, 296
- golden eye (*Bucephala*), duration of displays of, 116
- grammar, 58, 67, 97, 368; finite-state, 68, 84; generative, 58, 69; generative, of cultural conventions, 317; of non-speech, 318, 334, 345; phase-structure and transformational, 68–9; representational, in art, 367–8; universal, 98; in utterances of young children, 80
- grasshoppers, sound communication in, 28, 139
- Greece, ancient: art of, 377–8, 379
- greeting behaviour, 186, 187–8, 190; in different cultures, 299, 311, 312, 345, 346; grin-face in, 216; protective reflexes in, 240; smile in, 191, 232, 238, 299; tail-wagging in, 193
- grief, 303
- grin-face (silent or vocalised bared-teeth display), 212–17, 218, 219; different types of, 221–4; origin and development of, 217, 235–6, 240; and smiling, 225–7, 235
- grins: in protective response, 190; resemble attack behaviour, 202; in vocalisation, 192–3
- grooming of hair, 201; lip-smacking and, 215, 216; pair-bonding and, 330–1
- groups, voice quality identifying, 51, 52
- grunts, 131, 192
- guillemot (*Uria*), mutual recognition of parents and young in, 164
- guinea pigs: courtship and threat displays of, 181; shivering in, 199

436 Index

- gulls (*Laridae, Larus*): displays by, 103, 104–5, 180; pecking by young, 111; *see also individual species*
- Gymnotidae, electric signals of, 130–1
- hair: erection of, 197, 201; grooming of, 201, 215, 216, 330–1; symbolism of dressing of, 338
- hands: over face, 302, 303; position of, in different cultures, xii
- Haplochromis* (fish), spots on anal fin of, 121
- head: nodding of, (in assent) 303, 304, (in greeting) 299, 301, (in NVC) 248–9, 256, 260; shaking of, in denial, 303, 304, 305; touching of, by children, 275; touching of child's, by adult, 289
- 2-heptanone, ant pheromone, 136
- hermit crabs, interactions of different species of, 109
- hiding behaviour, 203
- hierarchy: in social performance, 260; in social structure, 335–6
- holophrastic speech, of children, 79
- hormones: effects of pheromones mediated by, 135; and response to signals, 108
- horses: courtship of, 193; shivering in, 199; sweating in, 196; tail-elevation in, 199
- humans: autonomic responses in, 195, 196, 197, 199; cultural context and NVC in, 315–47; language of, *see language*; NVC in social interaction of, xii, 243–69; smiling and laughter in, 193, 226–7, 231, 236, 238–40; speech of, *see speech*; *see also babies, children*
- Hymenoptera, pheromones of, 135–8; *see also ants, bees*
- hypothalamus: behaviour induced by stimulation of, 194, 202, 203
- idealisation, in linguistic description, 58–61, 124
- idiolects, 59
- illocutionary force, 75
- imitation: manual, by chimpanzees, 39; unconscious, 259, 260; *see also mimicry*
- immobility, 191; continuum from exertion to, 195–6; reflexes preceding and accompanying, 195; as response to signal, 102; tail in, 199
- incest taboo, 339
- indexical features (showing source): of animal communication, 124, of language, 52, 71–3, 74, 84; of non-speech, 319; of voice quality, 52, 82
- individuals: differences in NVC by, 263; differences in songs of (birds), 33, 153, 162–72, 59; idiosyncrasies of, in ritual, 320–2, and in theatre, 366–7; voice quality of, 51, 52, 171
- 'inflecting' languages, 66
- information, 8, 71; analysis of flow of, 12–21, 24, 25, 86; measurement of flow of, 7–9, 108–9; transmission and reception of, 4, 6, 8, (without communication) 5, 18–19
- information statistic, Shannon's, 109, 125
- innate, meaning of, 96–7
- insectivores, vocalised bared-teeth display in, 213
- insects, communication in: by chemical signals, 135–8; by dancing, 131–5; by sound signals, 138–40, 141; by visual signals, 140, 142–3; *see also individual groups and species*
- instinct or learning, in ontogeny of animal signals, 110–11, *see also innate, ontogeny*
- instrumental signals, 74–5
- integration of signals, faculty shared by humans and animals, 332–3
- intention: in non-speech, 325; in NVC, 349; in speech, 75, 80, 84, 88
- interactions: between organisms, different levels of, 92–3; social, of humans, NVC in, xii, 243–69
- interpersonal attitudes: NVC in, 251–2; NVC interpreted in terms of, 258
- interchangeability of transmitters and receivers, in vocal communication, 28–9, 30–1
- intonation (pitch) in language, 52, 53, 82, 91, 251, 254; of adults speaking to children, 287, 289; of children, 287–8; design features not applicable to, 54; modulation of verbal communication by, 361; and status, 252
- Ips* (bark beetle), pheromone of, 137
- Iridomyrmex* (ant), pheromone and exocrine gland system of, 136
- Japan: eyebrow 'flash' in, 299, 307–8; NVC in, 246, 264, 299; phallic amulets from, 307, 309
- joking, institutionalised, 238
- Juncos*, learning of song by, 160
- juncture (pauses and timing), in speech, 251, 254
- kinesis, in NVC, 254–7, 265
- kissing, 302; in different cultures, 346
- kittiwake (*Rissa*), fidelity to mate in, 163
- lamentation, at funerals, etc., 330, 331–2
- lampreys, detection of amines by, 130
- Lampyridae, flash communication in, 140, 142–3

Index 437

- language, 4–7, 46–7; cognitive and social functions of, 55, 73; complexity of, 92–4; as demarcation between humans and animals, 47, 49, 75, 77, 82, 95–6, 98; design features of, 28; duality of patterning of, 65–7; human, 49–55, 75–85, 173–4; innateness of, in humans, 96–7; learning of, 97–8, 368 (*see also under children, chimpanzee*); meaningfulness of, 70–5; metaphoric and metonymic poles of, 323; NVC inter-related with, 346; NVC as a kind of, 243, 265; origins of, 75–7, 94–8, 174; and speech, 49, 62–6, 78; syntax of, 67–70; theory of, 55–62, 75–6; *see also sign languages, token language*
- language behaviour and language systems, 49, 55, 56, 58, 82, 320
- Laniarius* (shrike), songs of, 154, 160–1
- Lanius* (shrike), learning of song of, 159
- Lasius* (ant), pheromones of, 137
- laterality, symbolism of, 337
- Latin Americans, NVC between, 247
- laughter: in children, 279–81; in different cultures, 311, 345; smiling and, 209–12, (conflict in) 239–40, (continuum of) 231–5, 236, (ontogeny of) 236–8, (phylogenetic hypotheses for) 225–7, 235, 240–1, (possible primate homologues of) 212–25, 239, (questionnaires on associations of words with) 227–31; social influences and, 238–9
- learnability, of vocal communication, 28–9, 33–4
- learning: of bird-song, 157–62, of language, 97–8, 368; of NVC, 267; *see also under children, chimpanzee*
- leeches, mechanical signals by, 146–7
- legibility, in art, 374, 376, 381
- lemurs: grin and yip call of, 197; scent-marking by, 199; wails of, 191, 192
- liking/disliking, NVC of, 258
- linguistic approach to NVC, 265–7
- linguistic features of language, 52, 82, 91
- ‘linguisticness’: scale of, in language, 54, 90–1
- linguistics: concerned with language system rather than language behaviour, 320; observational and theoretical vocabulary of, 56; theory of, 55–62, (theory of evolution and) 75–6
- linguists: as ethologists working with humans, 173; gulf between behaviourists and, 122, 329
- lips: in aggressive interactions of children, 284–5; displays of smacking of, 192, 201, 215, 216–17
- listener: feedback to speaker from, 251, 255, 258, 260; preliminary signals from, 361
- literature, concept of, 64
- lizards: displays of, 105, 106, 119, 129; vocalisation by, 129–30
- locomotion group of responses, in mammalian displays, 193–4
- locutional features of vocal communication, 52, 54, 91
- looking, *see gaze*
- Lophophorus* (bird), courtship display of, 117
- luminous signals, 110; of Crustacea, 144; of fireflies, 140, 142–3; of Polychaetes, 147
- Macaca assamensis*, grin-face in, 216
- Macaca irus* (crab-eating monkey): bared-teeth display in, (silent) 213, 215, (vocalised) 214; teeth-chattering in, 215–16
- Macaca maurus*, grin-face in, 215
- Macaca speciosa*, *M. sylvana*, grin-face in, 216
- macaques: calls of, 118; eyebrow-lifting in, 301; shivering in, 199; tail-elevation in, 199; yawning in, 202; *see also Macaca*
- mammals: displays of, 179–204; purposiveness of communication in, 47; *see also individual groups and species*
- Mandrillus*: grin-face in, 190, 215, 226, 236; play-face in, 226, 236
- mangabeys, eyebrow-lifting in, 301
- marriage, rituals at, 340
- marsupials, vocalised bared-teeth display in, 213
- masks, in ritual, 328
- mating calls, of frogs and toads, 128, 129, 151
- mating displays, of spiders, 30
- maze-running, by rats, 87
- meaning: of abnormal behaviour, different interpretations of, 349; distinction between message and, 153, 154; of facial expression (causes and effects of), 272; of message or signal, 17–18, 75; in theatre, 361–2, 366
- meaningfulness of language, 70–5
- medical consultation, communication in, 350
- medication, and behaviour, 352
- medium-transferability of a language, 66, 78, 332, 333
- mental illness, NVC in, 349–58
- message: in communication engineering, 92; distinction between ‘meaning’ and, 153, 154; distinction between symptom and, 19; three levels of, 321

438 Index

- meta-communication, *see* reflectiveness
- meta-evaluation, in information flow, 14, 15
- meta-linguistic use of language, 61
- meta-organizers, in information flow, 14, 15, 16, 18
- methylheptenone, ant pheromone, 136
- mice, scent signals of, 201
- millipedes, sound signals of, 146
- mimicry: in bird song, 53–4, 161–2; of pair-forming signals of prey species, in insects, 138; predators as signal receivers of, 120; of young of hosts, by parasitic birds, 120–1
- Minus* (mocking-bird), mimicry by, 161
- minnow (*Phoxinus*), fright producing secretion of, 130
- mismatch, evaluation of, 11, 12, 186–7, 191
- mistle thrush, alarm call of, 155
- mobbing, by birds, 155, 182–3, 187, 205
- mock-fighting or play, association of play-face with, 217, 235
- Mollusca, communication in, 146
- monkeys: calls of, 93, 118; copulatory signals in, 203; eyebrow-lifting in, 301; greeting displays in, 190; grooming in, 201; long-distance vocalisations of, 192; telemetric stimulation of electrodes in brains of, 107; *see also individual species*: e.g. baboon, *Cercocebus*, *C. pithecius*, *Colobus*, *Cynopithecus*, *Macaca*, *Man-drillus*, *Papio*, *Theropithecus*
- monogamy, pair-bonding in, 119
- mood, grammatical category, 75
- Mormyridae, electric signals of, 130–1
- morphemes, 65; in traditional theatre, 366
- mother: pointing by child as behaviour specific to, 274; separation of child from, 278; smiling in interaction of children with, 282
- moths: chemical communication in, 102, 138, 150–1; ocelli on wings of, 121
- motor activity, association of laughter with, 280
- mouth: contraction of sphincter muscle round, 192; retraction of corners of, (in attack) 202, (in bared-teeth display) 215, (in protective response) 189, 190, (in smile) 232, (in vocalisation) 192, 240
- music, 91; conductor's actions and, 318–19, 334–5; differences between speech and, 320–1; and emotions, 393
- 'musicality' of bird song, 174–5
- musk glands, of alligators and crocodiles, 129
- Mustelidae: bending of vertebral column in, 193; scent signals of, 200
- mynah (*Gracula*), mimicry by, 161–2; vocal communication in, 29, 34
- natural selection, 118, 163
- nature/nurture division in behaviour, 272, 297, 308–91, 315
- navigation, by birds, 94
- neurosis: symptoms of, as NVC, 257
- newts, signals between, 127–8
- noise/silence, symbolic use of, 344n
- nomination, in language, 74, 85
- non-goal-directed signals, 24
- non-language, interpenetration of language and, 54, 95
- non-reinforcement: in pigeons, 181; and tail-wagging, 193
- non-segmental features of utterances, 52, 83, 91
- non-speech, 317, 318, 342; ritual as, 329
- non-vocal communication, 50, 91
- nostrils, reflex dilation of, 196
- Notropus* (satin-fin shiner), sound signals of, 131
- novel stimuli, responses to, 185–8
- objects: showing of, by children, 273
- Odontosyllis* (Polychaete), flash signals of, 147
- odours, olfactory signals, 288–9; *and see* chemical communication
- ontogeny: of animal signals, 110–11; of language, 63, 79, 80, 98
- open mouth display, *see* play-face
- openness (creativity, new messages easily coined): in bee dance, 134; in communication, 28–9, 32, 69–70, 91, 94; in chimpanzee's use of sign language, 79–80
- opossum: attack behaviour of, 202; defensive threat behaviour of, elicited by hypothalamic stimulation, 203; scent-marking by, 199
- organising system, in information flow, 12, 13, 14, 15
- orientation (relative position): change in, as response to signal, 102, 113; of figures in art, 384; in human social interaction, 247, 255, 260, 335–6; to object of attention, 375
- orientation reflex, 185, 186
- Orthoptera, sound communication in, 138–40
- pace, in ritual, 327
- pair-bonding: in fish, 119, 120; hair-grooming and, 330–1; signals maintaining, in insects, 138
- Pan*, *see* chimpanzee
- panting, cooling response, 196
- Papio* (monkey), grin of, 215
- Papua, eyebrow 'flash' in, 299, 303

Index 439

- paralinguistic features of language, 27, 50–1, 91; design features applicable to, 28, 54; gestures, etc., as, 315–16; may be indexical, 72; and prosodic features, 53, 54, 62, 83; in speech, 251, 268; in writing, 64
- peacock (*Pavo*), courtship display of, 114, 115, 117, 184
- peck order: in children, 277, 282; in mantis shrimps, 109; and response to signal, 108; *see also* dominance, status
- perception: mutual, of goal-directedness of signal, 20, 24; of NVC, 257–9
- performance phenomena: in animal communication, 124; in speech, 58–9
- performative functions, of language, 85, 87
- personality: in art, 393; interpretation of NVC in terms of, 257; as sum of social performances, 263; in theatre, 362–5; voice quality identifying, 51
- phallic display, 116, 306–10, 314
- phasic level of interaction, 92
- ‘phatic communion’, 73
- pheasant (*Phasianus*), courtship display of, 114, 115, 117
- pheromones, *see* chemical communication
- phonemes, 53, 65
- phonological structure of language, 65, 67, 78
- photographs, judgement of facial expression in, 244, 351, 353
- Phrynelox* (angler fish), parasitises response of prey to feeding stimuli, 121
- Phyllomedusa* (tree frog), post-oviposition male release call in, 129
- pictographic style in art, 381–2, 383, 384, 386
- pigeons: aggression by, 181; conceptualisation by, 39–40; song of, 157
- play categories of behaviour, 221, 222, 223, 231, 235; association of laughter with, 229, 230; gestures inviting to, 108; *see also* rough and tumble play
- play-face (relaxed open-mouth display), 108, 212, 217–18; and laughter, 225–7, 240, 281; and mock fighting (rough and tumble play), 217, 235, 236, 237, 281; resemblance of wide-mouth laugh to, 232–3
- pointing, by children, 273–4
- Polychaetes, luminous signals of, 147
- polygamy, sexual dimorphism and displays in, 119
- Polyplectron* (bird), courtship display of, 115, 117
- postural reflexes, on continuum between exertion and immobility, 198, 199, 200
- posture: in human social interaction, 248, 256; modulation of verbal communication by, 361; in ritual, 327; and status, 248, 252; symbolism of, 337; *see also* displays
- pragmatics, 70; 200–, 92
- predators: bird alarm calls about, 32, 93, 118, 154–7; as signal receivers of mimicry, 120
- pressure, waves of, detected by swim bladders of fishes, 131
- prevarication, in vocal communication, 28–9, 33, 71
- primates: attack behaviour of, 202; bounding by, 193; calls of, 181, 191, 211; displays by, 180; facial displays of, *see* grin-face and play-face; vocal communication in, 29; *see also under individual species*
- priorities: evaluative systems and, 5, 14, 17; of speech over writing, 62–3
- pronouns, learnt by chimpanzee in sign language, 40
- propyl isobutyl ketone, ant pheromone, 136
- prosodic features of language, 52–3, 72, 82, 91; in NVC, 251, 254, 265, 268; and paralinguistic features, 53, 54, 62, 83; and verbal features, 62; in writing, 64
- protective group of responses, in mammalian displays, 113, 189–91, 203, 214, 294
- protective reflexes, in greeting, 240
- proxemics, 343n–344n
- proximity: in human social interaction, 247, 255; individual preferences in, 263
- psychiatry, NVC in, 351
- psychology, social: approach to NVC through, 266–7
- purposiveness, in communication, 47
- Rana catesbeiana*, mating call of, 151
- Rana pipiens*, female release call of, 129
- reciprocity, in primitive societies, 259
- recognition: ‘shock’ of, 186; signals of, in social insects, 138
- recognition comparison, 186–7, 189, 191, 193, 204
- redundancy, of signalling process, 9, 15, 67, 125
- reed bunting, alarm call of, 156
- reflectiveness (meta-communication, ability to communicate about communication system), 28, 33, 54, 74; in animal communication, 108, 124
- reinforcement: head nods in, 248; of verbal by non-verbal communication, 259–60
- release calls, in frogs and toads, 128–9

440 Index

- releaser effects: in displays of spiders, 145; of pheromones, 135
- releasing mechanisms, innate, 312, 313
- religious behaviour, specific to humans, 316
- reptiles, communication in, 129–30
- research in NVC; methods of, 103–7, 243–6
- respect, gestures of, 346
- respiratory reflexes, on continuum between exertion and immobility, 196
- responses: conflict between, 204; grouping of, in mammalian displays, 185–203; sequences of, 259–60; *see also* stimulus and response
- responsiveness: to displays, 295, 312–13; specificity of, 150–1
- reverence, expression of, 375
- Rhodeus* (bitterling), courtship display of, 184
- ring dove (*Streptopelia*): reproductive behaviour in, 102; weaning of, 104
- rites de passage, 339–40
- ritual: assertion of continuity by, 316; individual idiosyncrasies in, 320–2; private and public interpretations of, 324–5, 343; symbolisation of words in, 316, 394; taboos and, 339
- ritualisation: in animal communication, 115–20, 177, 214, 294, 315; cultural, 303, 304, 313, 344n
- robin (*Erithacus*): alarm call of, 155; response of, to intruders, 153, 154; sequence of phrases in song of, 107
- rocking, as comfort movement and in ambivalent situations, 357
- rodents, vocalised bared-teeth display in, 213
- rough and tumble play: laughter and, 227, 280, 281; play-face and, 217, 235, 236, 237, 281
- salamanders, signals between, 128
- Samoa, eyebrow ‘flash’ in, 299
- scent-marking displays, 199–201
- schizophrenics, 352, 353, 354, 355
- Scleropus* (lizard), nodding displays of different species of, 105, 106, 119
- screaming by children, 287; continuum between laughter and, 281
- sea anemones, and symbiotic fishes, 147, 148–50
- sea birds: colonies of, as social units? 172; colony-nesting, vocal communication between, 29, 162–71, 172
- secretions, symbolic uses of, 328, 344
- segments, in language (phonemes and words), 52, 65
- selection, of standard forms in response to signals, 8–9, 11, 18, 291; *see also* natural selection
- selective information content, 9, 10
- self-presentation, 73, 248, 253, 262, 266; voice quality in, 51
- self-representation, 20n
- semanticity, 58, 70; in bee dance, 134; in both language and NVC, 76; difficulties in concept of, 93; nature of, depends on meaning attached to ‘meaning’, 91; in vocal communication, 28–9, 31; in use of sign language by chimpanzee, 79
- semantics, 70, 75, 78; 200-, 91–2
- semiotic functions of language, 62, 73–4, 75–6, 85
- semiotics, 70, 91, 395; 200-, 91–2
- senses: peripheral, responses to signals in, 150–1; use of different, in animal communication, 109–10
- sensory motor system: and language, 80–1; and NVC, 81
- sentences: contextualisation of, in utterance, 83; relation of utterances to, 58–61, 68, 124
- sex: and crying in children, 279; symbolic aspects of, 337–8, 342
- sexuality, association of head hair with, 338
- shaking responses, 189, 201, 304
- shivering, 196, 198–9
- shrimps: mantis, peck-order of, 109; snapping, sound signals of, 144
- shrugging of shoulders, not recorded in schizophrenics, 352–3
- sign (gesture) languages, 256–7, 264, 267, 268; affirmation and denial in, 303–5, 333–5; *see also* American Sign Language
- signal level of interaction, biosocial, psychosocial, and symbolic, 92–3
- signals, 6, 103, 122; altering significance of later signals, 108, 124; analogue or digital, 117–18; communicative and informative, 71; culturally standardised and idiosyncratic, 320–2; integration of, 332–3; intended and unintended, 319, 322–6; main types of, in human NVC, 86–90, 246–51; social, in animals, 101–3
- skills (subroutines), acquisition and preservation of, 5, 15, 17
- skunk (*Mephitis*), scent signals of, 200
- slime moulds, aggregation of, 150
- smiling, 193, 211–12; associated with affiliative category of behaviour, 228–30; in babies, 212, 236–8, 271; in blind babies, 272; in children, 280, 282–3; in different cultures, 345; different forms of, 231–2, 237–8, 283, 284, 292, 293; in greeting, 191, 232, 238, 299; grin-face and, 225–7, 235; laughter and, *see under* laughter
- snorting, sound signal in ungulates, 201

Index 441

- sociability, teachers' ratings of, 282
 social conventions, 261, 265–6
 social (interpersonal) function: of eyebrow flash, 300, 301; of language, 55, 73
 social interactions: NVC in, 259–61, 267–9; (in children) 272–3; in pictures, 374, 376, 377, 380–1
 social situation: in communication, 34–5; NVC in management of, 55, 251–3, 263–4, 267, 268
 socio-biologist, focus of interest in behaviour for, 89, 90
Solenopsis (fire ant) chemical trail of, 109, 136
 sound signals: of Crustacea, 144; of insects, 138–40, 141; methods of locating, 156–7; recognition of, 164; volume of, 361; in water, 110, 131; *see also* vocal communication
 sound spectral synthesiser, 7
 sound spectrograms: of bird alarm calls, 155, 156; of calls of terns, 165–7, and gannets, 168–71; of cricket sound signals, 140, 141
 sound spectrograph, 7
 source, in communication engineering, 71, 92
 space, personal: invasion of, 244
 sparrow: song (*Melospiza*): song of, after fostering by canaries, 157; white-crowned (*Zonotrichia*), song of, 160
 speaker: feedback from listener to, 251, 255, 258, 260; preliminary signals from, 360
 species: different, same signals from, 143; different, signals between, 120–2; recognition of, from bird song, 33, 167; related, signals of, 116, 118–19; related, pheromones of, 137; the same, from different districts, 151, 160
 spectacles: wearing of, and judged I.Q., 244
 speech: acquisition of, *see under* children, ontogeny; addition of, to pictures, 374; crucial distinction of humans, 316–17; of individuals, computer recognition of, 171; language and, 49, 62–6, 78; more basic than written language, 50, 62–4; non-verbal aspects of, 50–5, 251; in theatre, 371; transmission of, in writing, 64; *see also* utterances
 speech acts, 85
 speech events, 56
 squirrels, tail-flicking in, 194
 standardisation, in linguistic description, 59–60
 starling (*Sturnus*), mimicry by, 161
 startle response, 121–2, 191, 240
 status: attitudes conveying, 248, 252; protective responses and, 190; in ritual, 326; signal markers of, 335–7; *see also* dominance, peck order
 stereotypy, in displays, 116
 stimulus and response: in animal behaviour, 23, 102; dispute between cognitive theories and theories of, 87; in non-verbal rituals, 328–9
 stimulus contrast, 186, 206
 stimulus control, language free from, 57, 70, 83, 84
 stonechat, alarm call of, 155
 stress, in language, 52–3, 82, 91, 251, 254
 stretching responses, 202
 structuralism, 332–3, 334–5; aesthetic, in theatre, 372
 submissive (fearful) categories of behaviour, 221, 222, 223; laugh and smile incompatible with, 229, 230; postures in, 195, 197; questionnaire on associations of words with, 227–8; sequences in, 316
 suckling, tail-wagging during, 193
 suicide, attempted: as appeal for help, 350
 Sulidae, sky-pointing display in, 116
 sun: bee dance and, 115, 132; bird navigation and, 94
 surprise, eyebrow-lift in, 300–1
 sweating, in preparation for exertion, 196
 Sweden, NVC in, 247
 swim bladders of fish, transducers for pressure waves, 131
 symbols: of abnormality, 336, 337; coding of, 326–8, 347; of laterality, 337; metaphoric and metonymic, 323, 342; rituals built up from, 342; sexual, 334, 335
 symptoms: distinguished from messages, 19, 22; indicating state of sender, 72, 83
 syntactic level of organisation in language, 65, 66
 syntaxics, 70; zoö-, 92
 syntax, 67–70, 78; in animal communication, 107; of NVC, 265; of sign language, chimpanzee and, 41–2, 45; of token language, chimpanzee and, 46
 taboo, 338–9
 tactile signals: in newts, 128; in water-mites, 146
Taeniopygia (zebra finch), plumage colour in inter-relations of, 105
 tail: elevation of, 198, 199; flicking of, (in birds) 184, (in squirrels and tree shrews) 194; wagging of, 193, 295–6; in warming reflex, 197–8
Tapinoma (ant) pheromone of, 136
 teeth: chattering of, 181, 199, 215–16, 217; grinding of, 275

442 *Index*

- television: NVC in, and theatre, 369–72
- tern, common (*Sterna hirundo*): calls of individuals, 167, 172
- tern, Sandwich (*Sterna sandvicensis*): calls of individuals, 164–7
- terpenoid alcohols, ant pheromones, 137
- territory: alternation of attack and flight, in defence of, 177; bird song and, 153; calls in maintenance of, 129, 192; communication of claim to, 22–3; defence of, by schizophrenics, 355; scent signals and, 201; sequences of behaviour marking, 316
- thalidomide children, facial expressions of, 306
- theatre: action and expression in, 374–6; cinema and TV and, 369–72; critics of, 365, 366; declamatory style of speech in, 371; fiction and, 368–9; heightened artificiality probable in, 371–2; naturalistic Western tradition in, 366–7, 371; NVC in, xi, 359–62, 394; personality in, 362–5
- thermoregulatory reflexes, on continuum between exertion and immobility, 196
- Theropithecus* (gelada baboon): flushing of skin of, 196–7; gnaw-wrestling by, 226; grin-face in, 215, 226, 236; play-face in, 236
- threat displays, defensive, 184, 194–5, 203; conflict between aggression and flight in, 112, 113, 180, 184–5; protective responses in, 190
- thrushes, vocal communication in, 29
- thumb- or finger-sucking in children, 274–5
- tickling, play-face display evoked by, 217, 281
- Tilapia* (fish), threat displays in different species of, 120
- time: dimension of, in symbolisation, 336
- tit, blue (*Parus caeruleus*): alarm call of, 156; threat postures of, 104
- tit, great (*Parus major*): alarm call of, 156; hammering with bill by, 183; threat postures of, 205
- toads, calls of, 128–9
- token language, taught to chimpanzee, 45–6
- tongue: in courting, 217, 303; protrusion of, 189, 311
- tone languages, 82
- tortoises, vocalisations of, 129
- tradition (teaching and learning), in vocal communication, 28–9, 32
- trigger effect (specialisation), in vocal communication, 28–9, 31
- Tropheus* (fish), yellow band in behaviour of groups of, 120
- trout, detection of amines by, 130
- Tupaia* (tree shrew), scent-marking by, 199
- turtles, vocalisations of, 129
- Tyrannid flycatchers, locomotory hesitation vocalisation of, 123, 205
- Uca* (fiddler crab), gestures of, 143–4
- Unionicola* (water-mite), responds to chemical of host, 146
- unresponsiveness, 191
- urination, in displays, 181, 200–1
- utterance-types and utterance-tokens, 56–7, 58, 84
- utterances, 56; context-dependent, 60–1; relation of, to sentences, 58–61, 68, 124; as signals, 122
- V for victory sign, 323–4
- variation: in language, 59, 60; in NVC, sources of, 261–3
- verbal component of language, 50, 53, 54, 55, 77, 91; may not involve communication, 49, 87; NVC interpenetrated with, 315; NVC as modulator of meaning of, 361; NVC as replacement for, 256–7, 264, 267, 268; NVC as support for, 55, 253–4, 264, 265, 267, 268, 359–60; paralinguistic and prosodic features and, 62
- Viduine weaver birds (parasitic), mimicking of host young by young of, 120–1
- visual reflexes, 188–9
- visual signals: in Cephalopods, 146; in fishes, 130; in newts, 128
- vocabulary: in behaviour patterns of normal and mentally ill persons, 353; of linguistics, 56; in signs, of chimpanzee Washoe, 41; in tokens, of chimpanzee Sarah, 45; in words, of chimpanzee Viki, 36, 41
- vocal-auditory channel of communication, 28–9, 30, 50, 51
- vocal communication: in Amphibia, 128–9, 151; in birds, 153–76; comparison of, in humans and animals, 27–47; design features of, 28–35; non-verbal, by children, 286–8; in reptiles, 129–30
- vocal NVC, 254–7
- vocal reflexes, 51, 91
- vocalisation: in laughter, 232; in mammalian displays, 191–3; not essential feature of language? 64, 91; possible origin of, from protective glottal closure, 191, 201
- vocative signals, in language, 74
- voice quality (voice set), 51, 72, 91; information in, 82
- warming reflexes, with tail, 197–8
- water, sound signals in, 110, 131

Index 443

- water mites, chemical and tactile communication in, 146
- waving, by children, 274
- wing-beat frequency, in insects, 112, 134
- wolves, variability of behaviour in, 308
- word-form, phonemic and prosodic characteristics of, 84
- words, 52, 65, 67; indexical use of, 72;
- inter-relations of, 70; two senses of, in inflecting languages, 66
- work groups, social interaction within, 262
- wren (*Troglodytes*): alarm call of, 155, sequence of phases in song of, 107
- written language, 50, 62–4, 65
- zoo-semiotic systems, 91–2