randomised studies of the widely used immunosuppressive regimens for treating sperm antibodies, though a study is now under way. No controlled trials of different methods of in vitro fertilisation have used childbirth as the end point. Thus the first advance must be to organise randomised controlled trials to test widely used treatments. In order to avoid the type II error large cohort sizes will be required and multicentre collaboration will be essential. National organisations such as the British Fertility Society will have a large part to play.

The second form of research must be basic physiological and biochemical studies. The causes of many unexplained cases of subfertility and the reason for the poor implantation rates with in vitro fertilisation will emerge from basic biochemical research, and endocrinologists are turning their attention from measurement of hormone concentrations in peripheral blood to the subtleties of endometrial, ovarian, and fallopian tube biochemistry.[23-25] The news for male oligozoospermia, still the commonest known cause of subfertility in Europe, is more depressing. The first important lesson was that a low sperm count is merely a marker for sperm function. Fertility can be achieved with very low sperm numbers in vitro, and hypothalamic eunuchs with normal spermatogenesis often achieve pregnancy in the early phases of gonadotrophin treatment when the spermatozoa first appear. Oligozoospermia therefore implies a generalised defect in sperm function. Oligospermic patients seldom conceive after in utero sperm insemination,[11 12] but closer admixture of sperm and egg with in vitro fertilisation or gamete intrafallopian transfer may result in successful fertilisation.[26 27] The zona pelucidum forms a barrier to severely defective sperm, which may be overcome by periviteline microinjection of sperm heads; the practical importance of this observation is, however, limited, and such sperm might carry a defective genetic message that could impede implantation and subsequent embryonic development.[27] Further improvements in managing male infertility will therefore depend on a deeper understanding of chromosome function and gene transcription in normal and defective sperm.[28]

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1 Winston R. *Infertility. A sympathetic approach*. London: Martin Dunitz, 1986:1.
2 Burslem RW, Osbourne JC. Unexplained infertility. *Br Med J* 1986;292:576-7.
3 Katayama KP, Kap-Soon JU, Manuel M, Jones GS, Jones H. Computer analysis of etiology and pregnancy rate; in 636 cases of primary infertility. *Am J Obstet Gynecol* 1979;135:207-14.
4 Hull MR, Glazener CMA, Kelly NJ, *et al*. Population studies of causes, treatment and outcome of infertility. *Br Med J* 1985;291:1693-7.
5 Whitelaw MJ, Kalman CF, Grams LR. The significance of the high ovulation rate versus the low pregnancy rate with Clomid. *Am J Obstet Gynecol* 1970;107:865-9.
6 Schill WB. Medical treatment of male infertility. In: Insler V, Lunenfeld B, eds. *Infertility male and female*. Edinburgh: Churchill Livingstone, 1986:533-73.
7 Aafjes JH, Van der Vijver JCM. Fertility of men with and without varicocoele. *Fertil Steril* 1985;43:901-6.
8 Weiss DB, Rodriguez-Rigau L, Smith KD, Steinberger E. Ledgdig cell function on oligosperimic men with varicocoeles. *J Urol* 1978;120:427-30.
9 Hendry W, Goldstraw P, Husband JE, Barrett A, McElwain JJ, Peckham MJ. The results of intermittent high dose steroid therapy for male infertility due to antisperm antibodies. *Fertil Steril* 1981;36:4-7.
10 Wathen NC, Perry L, Lilford RJ, Chard T. Interpretation of single progesterone measurements in the diagnosis of anovulation and defective luteal phase: Observations on analysis of the normal range. *Br Med J* 1984;288:7-9.
11 Moghissi KS. Some reflections on intrauterine insemination. *Fertil Steril* 1986;4:13-5.
12 Allen NC, Herbert CM, Maxson WS, Rogers BJ, Diamond MP, Wentz AC. Intrauterine insemination: a critical review. *Fertil Steril* 1985;44:569-80.
13 Dmowski WP, Rao R, Scommegna A. The luteinised unruptured follicle syndrome and endometriosis. *Fertil Steril* 1980;33:30-4.
14 Drake TS, O'Brien WF, Ramwell PW, Metz SA. Peritoneal fluid thromboxane B_2 and 6 ketoprosta- glandin F_2 in endometriosis. *Am J Obstet Gynecol* 1981;140:401-6.
15 Rutherford RN, Banks L, Coburn WA, Zaffiro FH, Williams J. The treatment of psychological factors in anovulation. *Fertil Steril* 1961;12:55-9.
16 Bromham DR, Lilford RJ, Balmer B, Wright S. Psychometric evaluation of distress and anxiety in infertile couples. In: Teoh ES, Ratnam SS, Lim SM, eds. *XII World congress on fertility and sterility, Singapore, 26-31 October, 1986. Handbook of abstracts III*. Singapore: Obstetrical and Gynaecological Society of Singapore, 1986:674.
17 Dennerstien L, Morse C. Psychological issues in IVF. *Clin Obstet Gynaecol* 1985;12:835-46.
18 Vere MF, Joyce DN. Luteal function in patients seeking AID. *Br Med J* 1979;ii:100.
19 McBain JC, Evans J, Pepperell RJ, Robinson HP, Smith MD, Brown JD. An unexpectedly high rate of ectopic pregnancy following induction of ovulation with human pituitary and chorion gonadotrophin. *Br J Obstet Gynaecol* 1980;87:5-9.
20 Whitehead MI, Campbell S, Parsons J, *et al*. The King's College Hospital IVF programme 1982-85. *Fertil Steril* 1986;45(suppl 355):122S.
21 Olive EL. Analysis of clinical fertility trials. Methodological review. *Fertil Steril* 1986;45:157-69.
22 Jansen RPS. Endocrine response in the female genital tract. In: Shearman R, ed. *Clinical reproductive endocrinology*. Edinburgh: Churchill Livingstone, 1986:109-64.
23 Johanisson E. Cyclical changes in endometrial morphology. In: Shearman R, ed. *Clinical reproductive endocrinology*. Edinburgh: Churchill Livingstone, 1985:129-32.
24 Batra S, Helm G, Owman C, Sjoberg NO, Walles B. Female sex steroid concentrations in the ampullary and isthmic regions of the human fallopian tube: their relationship to plasma concentration during the menstrual cycle. *Am J Obstet Gynecol* 1980;136:986-91.
25 Garfield RE, Hayashi RH. Presence of gap junction in the myometrium of women during various stages of menstruation. *Am J Obstet Gynecol* 1980;138:569-74.
26 Yovich J, Stonger J, Yovich J. The management of oligospermic infertility by in vitro fertilisation. *Ann NY Acad Sci* 1985;442:276-86.
27 DeKretser DM, Yates C, Kovacs GT. The use of IVF in the management of male infertility. *Clin Obstet Gynaecol* 1985;12:767-74.
28 Rudak E, Jacobs P, Yanagimachi R. Direct analysis of the chromosome constitution of human spermatozoa. *Nature* 1978;274:911-3.

The wide range of chlamydial infection

What's in a name? Shakespeare was certainly not thinking of chlamydiae when he penned these words, but Juliet's question could well apply to the taxonomic confusion that has beset this group of organisms.[1] As Ward has pointed out, the term chlamydia (a cloak) is a misnomer[2]: 80 years ago Halberstaedter and von Prowazek first observed inclusions of the trachoma agent in infected ocular material and, thinking they were protozoans, gave the name chlamydozoaceae to these "mantled animals."[3] The chlamydiae were later again wrongly classified as viruses, and terms such as bedsoniae and trachoma inclusion conjunctivitis (Tric) agents were formulated, but eventually the controversy over whether the organism was a virus or bacterium was resolved by Moulder in 1966.[4] Is is incontrovertibly a bacterium with affinities to the Gram negative cocci,[5] and the two species of the genus are *Chlamydia trachomatis* and *C psittaci*.

The clinical features of chlamydial infection can cause equal confusion as their range is wide and continues to expand, although evidence on related conditions goes back to antiquity. Ridgeway noted that a reference to trachoma is to be found in the Ebers papyrus (1500 BC), where cicatrising eye disease and its treatment with copper salts is described.[5] Even earlier accounts of the disease and its treatment have been listed by Duke-Elder—China in the twenty seventh century BC, Sumeria in the twenty first, and Egypt in the nineteenth.[6] In northern Europe trachoma was unknown until the middle ages, when it was introduced by the Crusaders returning from Palestine; during the nineteenth and early twentieth centuries the disease became widespread in Europe, especially around the Mediterranean. The causative organism, *C trachomatis*, is responsible for the world's commonest eye disease; it affects 500 million people, mainly in the rural communities of Africa, the Middle East, and the Far East.[7]

C trachomatis is also common in the developed world, causing various genital and oculogenital infections. Associations have been reported with non-gonococcal and post-gonococcal urethritis, cervicitis, salpingitis, epididymitis,

Bartholinitis, and Reiter's disease[8]; about half the cases of reactive inflammatory arthritis occurring as a sequel to sexually acquired non-gonococcal genital tract infections are associated with *C trachomatis* infection.[9] Chlamydial urethritis and chlamydial cervicitis are the commonest venereal diseases in the United Kingdom and the United States.[10 11]

The other species of the genus, *C psittaci*, has tended to be rather neglected in recent years mainly because of the expanding interest in *C trachomatis*. But infection associated with psittacine birds has been known since 1879, when the Swiss physician, Ritter, observed respiratory illness in a household where there were sick parrots.[12] Little attention was paid to the disease until 1919, when outbreaks associated with South American parrots occurred in many countries.[13] Budgerigars are now the commonest source of human psittacosis in Britain, although often an avian source of infection cannot be traced.[14] In 1948 ornithosis (the general term used to include strains from non-psittacine birds) was associated with the processing of turkeys after an outbreak at a Texas plant resulted in 22 human cases and three deaths.[15] In Britain duck associated outbreaks have been reported in the past few years: in the winter of 1979 and the spring of 1980 an outbreak among workers in the duck industry in Norwich resulted in 19 cases,[16] and in November 1980 15 out of 46 veterinary surgeons attending a training course on inspecting poultry processing plants became infected.[17]

The importance of *C psittaci* as a cause of human morbidity has been heightened by two recent advances. Grayston and others have discovered a new strain of *C psittaci*, the TWAR agent (TWAR is an acronym indicating the geographical site of the first isolate—TW for Taiwan—and the clinical condition associated with the second isolate—AR for acute respiratory disease), which is a common cause of pneumonia. The second discovery is the increased incidence of abortion among pregnant women who are in contact with infected sheep.[18] TWAR infection was detected in 12% of cases of pneumonia (9/76) and in 21% (8/38) of those confirmed radiologically. The illness was clinically similar to mycoplasma pneumonia, and an epidemic of pneumonia in Finland has also been attributed to these organisms.[19]

Some non-avian strains of *C psittaci* are common causes of enzootic abortion in sheep, and the organism is present in large numbers in the abortus, the placenta, and the uterine discharges.[20] The danger to pregnant women of contact with infected material has been suggested for some years,[21] but this hazard has been recently re-emphasised with further cases of chlamydial infection in pregnant women being reported.[22 23] Clearly, the chlamydiae are organisms to be heeded.

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1 Shakespeare W. *Romeo and Juliet*. Act II, Scene 2, line 43.
2 Ward ME. Chlamydial classification, development and structure. *Br Med Bull* 1983;**39**:109-15.
3 Halberstaedter L, von Prowazek S. Über zilleinschlüsse parasitärer Natur beim Trachom. *Arbeiten Aus Dem Kaiserlichen Gesundheitsamte* 1907;**26**:44-7.
4 Moulder JW. The relation of the psittacosis group [chlamydiae] to bacteria and viruses. *Annu Rev Microbiol* 1966;**20**:107-30.
5 Ridgway GL. Chlamydial infections in man. *Postgrad Med J* 1986;**62**:249-53.
6 Duke-Elder S. *System of ophthalmology*. Vol 8. London: Kimpton, 1965:260.
7 Darougar S, Jones BR. Trachoma. *Br Med Bull* 1983;**39**:117-22.
8 Taylor-Robinson D, Thomas BJ. The role of Chlamydia trachomatis in genital tract and associated diseases. *J Clin Pathol* 1980;**33**:205-33.
9 Keat A, Dixey J, Sonnex C, Thomas B, Osborn M, Taylor-Robinson D. Chlamydia trachomatis and reactive arthritis: the missing link. *Lancet* 1987;i:72-4.
10 Communicable Disease Surveillance Centre. Sexually transmitted disease surveillance in Britain—1984. *Br Med J* 1986;**293**:942-3.
11 Schachter J, Hanna L, Hill EC, *et al*. Are chlamydial infections the most prevalent venereal diseases? *JAMA* 1975;**231**:1252-5.
12 Macfarlane JT, Macrae AD. Psittacosis. *Br Med Bull* 1983;**39**:163-7.
13 Anderson DC, Stoesz PA, Kaufmann AF. Psittacosis outbreak in employees of a turkey-processing plant. *Am J Epidemiol* 1978;**107**:140-8.
14 Grist NR, McLeod C. Infections by organisms of psittacosis/lymphogranuloma venereum group in the West of Scotland. *Br Med J* 1964;ii:21-5.
15 Irons JV, Sullivan TD, Rowan J. Outbreak of psittacosis [ornithosis] from working with turkeys or chickens. *Am J Public Health* 1951;**41**:931-7.
16 Andrews BE, Major R, Palmer SR. Ornithosis in poultry workers. *Lancet* 1981;i:632-4.
17 Palmer SR, Andrews BE, Major R. A common-source outbreak of ornithosis in veterinary surgeons. *Lancet* 1981;ii:798-9.
18 Grayston JT, Kuo CC, Wang SP, Altman J. A new Chlamydia psittaci strain, TWAR isolated in acute respiratory tract infections. *N Engl J Med* 1986;**315**:161-8.
19 Saikku P, Wang SP, Kleemula M, Brander E, Rusanen E, Grayston JT. An epidemic of mild pneumonia due to an unusual strain of Chlamydia psittaci. *J Infect Dis* 1985;**151**:832-9.
20 Eddy RG, Martin WB. Pregnant women and chlamydia infection. *Vet Rec* 1986;**118**:519.
21 Roberts W, Grist NR, Giroud P. Human abortion associated with infection by ovine abortion agent. *Br Med J* 1967;iv:37.
22 Beer RJS, Bradford WP, Hart RJC. Pregnancy complicated by psittacosis acquired from sheep. *Br Med J* 1982;**284**:1156-7.
23 Johnson FWA, Matheson BA, William H, *et al*. Abortion due to infection with Chlamydia psittaci in a sheep farmer's wife. *Br Med J* 1985;**290**:592-4.

Bowlby's 80th birthday

What Francis Crick and James Watson were to molecular biology John Bowlby has been to child development. His highly original work done soon after the war has proved enormously fruitful, and it was no surprise that 400 participants from 20 different disciplines turned up to a conference organised by the Tavistock Clinic to celebrate his 80th birthday.

The appearance in 1951 of *Maternal Care and Child Health*, a book written at the behest of the World Health Organisation, led to vigorous discussion among all those interested in young children. It was translated into 12 languages and later abridged by Margery Fry to become *Child Care and the Growth of Love*, which sold half a million copies and is still in print. (Bowlby recently said, "It could do with a rub up, though.") Like many of his writings from 1938 this work showed how his imaginative thinking was backed up by systematic longitudinal studies. He and his colleagues showed how attachments develop from infancy into school age and at all phases of the life cycle—birth, adolescence, marriage, old age, and particularly bereavement.

Although psychoanalytic in his approach, Bowlby was, ironically, eclectic and egalitarian. He did not believe in the dominance of doctors and realised how much psychologists, social workers, and psychotherapists had to offer psychiatry if they came together. This was the philosophy of the Tavistock Clinic, where Bowlby was founder and first director of the child and family department. Bowlby also turned to ethology to see what it had to offer on the study of the relationships between mother and infant from its acute and intense direct observations and its systematic data collection.

He broke with the orthodox belief that infants were dominated by instinctive drives and genetically preprogrammed. He showed how vital was the infant's experience right from the start of life through attachment to the mother. If a child was given time, attention, and accessible, responsive interaction then the attachment was good and the child joyful, secure, confident, and independent. Poor attachment led to jealousy, anxiety, and anger, and broken attachment to grief and depression. Bowlby studied the quality of parenting, and while he emphasised how big a part the mother played he also recognised the importance of fathers. Their importance lay not only in relating well to their