In an investigation of 116 mothers and their breast-fed infants, there was no correlation between jaundice and birth weight, gestation, sex, birth rank or age of mother. But, as Wong and Wood say, "Of the 69 non-jaundiced infants 24 (34.8%) mothers had been on the pill; of the 47 jaundiced infants 33 (70.2%) mothers had been on the pill." Fifty-seven mothers in the study had been on the pill and 59 had not. There seemed to be no difference in the pattern of pill-taking between those mothers who had taken the pill and whose babies were jaundiced, and those mothers who had taken the pill but whose babies were not jaundiced.

But Wong and Wood seem to be at a loss to account for the link between the increased incidence of jaundice and the pill; pregnanediol, for example, is always present in breast milk, but it is hard to see how its effect could be enhanced by the consumption of the contraceptive pill many months before breast feeding begins. Nevertheless, as Wong and Wood say, the figures speak for themselves, and will attract much attention among obstetricians and paediatricians.

FISH

Surgeon Fish's Scalpels

from our Marine Vertebrate Correspondent

SURGEON fishes are widely distributed herbivorous fishes of shallow tropical seas. Many species are known of these mostly colourful fishes and all possess a basic deep-bodied but laterally compressed form. Their common name is derived from a sharp scalpel-like spine placed either side of the body just in front of the tail fin; the spines resemble the surgeon's scalpel in both shape and acuity. These spines (members of four of the recognized genera have one each side; others have two or more) are attached posteriorly with the free sharp point projecting forwards, although the whole spine slots neatly into a groove in the side.

It seems axiomatic that fishes possessing such formidable armament should be able to use it in everyday life, and this aspect of the biology of the surgeon fish has recently been commented on by R. Winterbottom (*Copeia*, No. 3, 562; 1971). Winterbottom reviews earlier studies on the musculature of the spines. Although the presence of four superficial muscles attaching to the base of the spine had been described originally, later workers have been unable either to detect them or to prove an attachment to the spine. Dissection shows that apart from some connective tissue between the spine base and the superficial musculature the only important connexion is ligamentary between the spine and the posterior vertebrae. How then does the surgeon fish erect its spines for use?

Having studied the behaviour of living specimens in an aquarium when presented with a mirror, Winterbottom found that a strong response was evoked in the fish, which changed colour and raised its fins. More significantly, the fish would swim in a tight circle lashing its tail strongly as it passed the mirror. It also rested close to the mirror with body flexed and beat at its image with its tail. Winterbottom concludes from this and from handling the living fish that the spines are not muscularly controlled, but that they are partially erected by the bending of the tail as the body flexes. Thus when swimming strongly to escape, or in attacks on an intruder, the spines would be alternately exposed with each beat of the tail, and contact with them while the fish was moving forward would cause the erection of the whole spine into its fully exposed position as well as driving it into the adversary.

Several cases of wounds caused by surgeon fish in man have been recorded, some of them to persons carelessly handling live fish which presumably wagged their tails in escape movements driving their spines into their captor's hand. Several surgeon fishes appear to have envenomed spines and wounds from these species can be extremely painful. Even lacking an erecting musculature it is obvious that the surgeon fish's spines are more than adequate defensive weapons.

PHOTOCHEMISTRY

Nonlinear Photolysis

from our Molecular Physics Correspondent

AN important, though not unexpected, advance in photochemistry has been taken with the demonstration of what appears to be the first clear-cut two-photon decomposition reaction in the gas phase. S. Speiser, I. Oref, T. Goldstein and S. Kimel of Technicon, Israel Institute of Technology, now seem to have proved beyond reasonable doubt that the photolysis of azoethane ($C_2H_5NNC_2H_5$) observed when it is irradiated at very high intensity at a wavelength to which it is nominally "transparent" can only be due to the simultaneous absorption of two quanta of the available light (*Chem. Phys. Lett.*, **11**, 117 ; 1971).

The normal, well-studied photolysis of azoethane takes place with light at a wavelength of around 352 nm with a quantum yield of some 0.8. Speiser and coworkers selected the convenient ruby laser frequency of 694.3 nm and by means of a Q-switching arrangement were able to administer a series of pulses of extremely high energy in this region where normally nothing would be expected to occur. They duly observed the liberation of nitrogen and were able to show that its production was very nearly proportional to the square of the pulse intensity, indicating

A Direct Acting Colicin

THE way in which that most curious class of proteins, the colicins, which are specified by extrachromosomal genes, are able to kill susceptible *E. coli* cells but do not kill their own host cells has long puzzled bacteriologists. In *Nature New Biology* next week, Nomura's group, adding another chapter to their most elegant exposition of the biology of colicin E3, explain how host cells develop specific immunity to this colicin and report evidence which suggests that the colicin penetrates susceptible cells and itself attacks their ribosomes.

Colicin E3 is, as Nomura and his colleagues and others have shown, a protein which kills *E. coli* by inactivating their 30S ribosomal subunits. The colicin causes a fragment of about 50 bases long to be cleaved from the 3′ end of the 16S RNA in the 30S ribosomal subunits. Until recently, most researchers who have worked with E3 and other colicins, which kill cells in quite unrelated ways, have suggested that these proteins remain on the surface of the cells to which they adsorb and mediate their lethal effect by causing some membrane change, rather than by entering the cell. This hypothesis now seems untenable as far as colicin E3 is concerned. Bowman, Sidikaro and Nomura have proved beyond doubt that *in vitro*, in the complete absence of any membrane, pure colicin E3 protein cleaves the 3′ end of 16S RNA in 30S ribosomes at the same point at which the 16S RNA is cleaved *in vivo*. In other words, the colicin attacks its target, the 30S ribosome, directly *in vitro*.

And that is not all. Bowman *et al.* have discovered that cells which carry the colicin E3 genetic factor and make E3 protein contain a substance or substances which protect the colicinogenic cell's ribosomes from attack by the colicin. In other words, cells which make colicin E3 are able to survive because they make an antagonist to E3. Presumably, past failures to detect *in vitro* the activity of colicin E3 reflect the fact that the impure preparations of colicin used contained this protective substance(s).

The fact that colicin E3 can act directly *in vitro* strongly suggests that *in vivo* it penetrates susceptible cells and directly attacks their ribosomes, rather than causing some change in the cell surface which in turn inactivates the ribosomes. If this is true of colicin E3, then it may well be true of other colicins.