Survey; Professor Reddish emphasized, however, that technological developments in the decades since that telescope was built have made possible considerable detailed improvements in the new telescope. For example, the tolerance of focus is much better than that of the Palomar Schmidt, and the new machine is guided by a sophisticated combination of digital and analogue computers which makes operation a one-man push-button affair.

The target date for completion of the instrument is July 1, 1973, just two years after the signing of the contract for its construction. This time scale is only half that which has been required for any comparable telescope, but construction is going ahead well on schedule at present. Although the ESO Schmidt will become operational rather earlier next year, there is certainly enough work for two such instruments in the southern hemisphere. There is already close collaboration between British and ESO groups, who have planned a joint programme of surveying.

First, the ESO Schmidt will be used for what Professor Reddish terms a "quick and nasty" survey, intended primarily to help radio astronomers to identify their sources. This will take less than a year. Starting at the same time, but taking two years to complete, the ESO group will survey the southern hemisphere below $-20°$ using red ($H\alpha$) plates and fields centred 5° apart. This will begin in January 1973, and by September 1973 the British Schmidt will be surveying the same fields in the blue (using IIIaJ emulsion).

The Palomar Sky Survey extends to $-30°$, so that there will be two 5° steps of overlap with the southern survey. Although the ESO Schmidt will produce smaller plates than the new 48-inch instrument, these will have the same scale and will be centred on the same fields—the 48-inch plates will have more overlap, but no astronomer will complain about that. Although the ESO group has the advantage of starting first, the SRC IIIaJ survey will extend one magnitude further, to 22 mag. At present there seems no reason to believe that either group will attempt to use the advantages of their own instrument to steal a march on the other, first because both groups do indeed have certain advantages to trade off, and second because a happy cooperative atmosphere has been firmly established before surveying has begun.

Undoubtedly, the sky survey will be the prime task of the 48-inch at first, and will fill a serious gap in observations. But this can only be carried out during the dark of the Moon, and it is also planned to allocate 10 per cent of this prime time to other projects. That leaves 60 per cent of the available telescope time to non-survey work—much of it will have to be carried out during light or grey of the Moon, but that is not an impossible handicap for many projects. The second purpose of this recent meeting, then, was to ask for suggestions concerning the use of the non-survey time which will be available. Some of the proposals already being considered include searches to find stars within 20 pc of the Sun and identifications of radio sources with distant galaxies.

It certainly seems that the British Schmidt at Siding Spring will have a full and active life; a note of caution was, however, introduced by Dr M. Rowan-Robinson (Queen Mary College) who urged that a programme of calibrations should be considered urgently as an integral part of the survey, because otherwise the plates will be useless for many purposes until such calibrations of reference sources have been carried out. This note of discord was, however, dismissed in the general euphoria as only a minor detail. The chief "complaint" apart from this came from the radio astronomers; Dr Denis Walsh (Jodrell Bank) lamented the fact that no comparable instrument is available to them in the northern hemisphere —the advantage of the extra couple of magnitudes over the Palomar Sky Survey would be considerable.

COLLAGEN

The Skin Game

from our Molecular Biology Correspondent

COLLAGEN is probably the most abundant of all proteins: Piez gives 10^{12} kg as a conservative estimate for the amount spread around the world. This alone is sufficient reason for taking an interest in its structure, concerning which a vast amount is already known. Nonetheless, it tends to be regarded as a rarefied field, which outsiders do not often penetrate. The general features of structure, from the sequence to the fibril, are established, and, apart from biosynthesis and assembly, most of the activity is now directed towards filling in the chemical detail, on comparing the collagens of different species and tissues, and on determining the basis of pathological defects.

Most collagens contain two types of polypeptide chain, α_1 and α_2, in the mole ratio of 2 : 1. Each molecule is a characteristic three-stranded rope with, depending only slightly on the origin, about 1,050 amino-acids a chain. Throughout most of the sequence every third residue is glycine, followed commonly by proline, and often preceded by hydroxyproline. This regularity is missing only at both ends, which are also of particular interest because it is here that the covalent cross-links occur. Large parts of both the α_1 and α_2 chains have been sequenced, and the various tracts are indexed along the chains in terms of the fragments that are generated by cyanogen bromide cleavage at the few methionine residues. The α_1 chain gives rise to nine and the α_2 to six such fragments.

Balian *et al.* (*Biochemistry*, **11**, 3798; 1972) have now completed the sequence of one of the two longest cyanogen bromide fragments (termed CB1) of the α_1 chain of rat collagen. This fragment, as Bornstein found, contained a labile asn-gly bond, which could be cleaved by hydroxylamine to give pieces of 99 and 180 residues. It is the second of these whose sequence is now also reported. Because CB8 comes from the interior of the α_1 chain, the triplet repeat is maintained, and only once in 279 residues does glycine occur anywhere except in the first position in each triplet. There are well defined preferences amongst the other amino-acids for the second or third

Right Side Outside

IN next Wednesday's issue of *Nature New Biology* (November 1), Kant and Steck put right earlier erroneous conclusions drawn from work on inside-out vesicles of red cell membranes. Sealed vesicles, as has long been recognized, can be prepared from red cell ghosts in such a way that the outer surface is the inner surface of the original membrane. These vesicles, as Kant and Steck show, can be completely sealed, so as not to pass sodium or potassium ions.

They use sedimentation in a dextran gradient to separate fractions, which they identify as sealed and unsealed vesicles. The sealed vesicles are tested for availability of acetylcholinesterase and diaphorase activity, these being confined respectively to the outer and inner surfaces of the red cell. Thus the right-side-out vesicles give a positive acetylcholinesterase response, whereas the inside-out vesicles give none, unless they are disrupted with detergents, or the like, when the enzyme becomes accessible. By applying this criterion, incorrect identification can be avoided.

It is now shown that in earlier work the introduction of magnesium ions brought about the formation of right-side-out vesicles in a procedure that would otherwise produce inside-out particles. In this work a series of membrane proteins, which all the available evidence indicates to be at the inner surface, were said to be located on the outer surface. Kant and Steck report that repetition of this work with correctly identified vesicles gave results in agreement with the experiments carried out by other workers using dfferent methods.