

wheats he finds a certain number of bivalent chromosomes, which are all telosynaptic or end-to-end. In crosses between *Æ. cylindrica* and the $6n$ wheats, however, he always finds constantly 7 parasynthetic bivalents formed from the end-to-end arrangement by the chromosomes swinging round to lie side by side. This, as well as the characters of *cylindrica*, point to the presence of 7 *cylindrica* chromosomes in the hexaploid wheats. Hence telosynaptic pairing is regarded as evidence of a less complete homology or a more distant relationship between the members of a pair than is parasynapsis.

The hybrid *Æ. cylindrica* × *Æ. ventricosa* is sterile, but its characters show remarkable resemblance to those of *T. spelta*. In meiosis there are 5-7 bivalent chromosomes, chiefly parasynthetic but some telosynthetic, indicating that one set of chromosomes are homologous in the two species. The two types of pairing are also described in various species-hybrids by Aase. Percival also considers *T. dicoccoides* ($4n$) to be an autopolyploid of *T. ægiloides*, and concludes that the emmer wheats are probably autopolyploids from the Einkorn wheats. These conclusions, however, require further evidence.

Nishiyama (1930) has described similar conditions in crosses of *Avena* species. *A. fatua* ($n=21$) × *A.*

sativa ($n=21$) gives a hybrid with 21 parasynthetic bivalents in meiosis, leading Percival to conclude that cultivated oats was derived from the wild *fatua*, while *A. barbata* ($n=7$) × *A. sterilis* gives telosynthetic pairs.

Watkins (1930) has just published an extensive critique of all the work on wheat (*Jour. Genet.*, vol. 23, No. 2), in which he points out difficulties with the theory of cumulative factors for size-inheritance as applied to wheats, and shows that the chromosome behaviour of hybrid cereals requires further study. While the details therefore remain uncertain, there is evidence for concluding that the origin of the hexaploid wheats has involved interspecific and intergeneric crossing, with allopolyploidy and probably also autopolyploidy, combined with the occurrence of numerous parallel unit mutations.

A recent study of the related grass genus *Agropyron* by Peto (*Can. Jour. Research*, vol. 3, p. 428) again shows $2n$, $4n$, and $6n$ species ($n=7$), with evidence of natural hybridisation between species having the same or different chromosome numbers. This condition is probably very similar to that under which the wheats evolved, except that the hexaploid wheats may have arisen entirely under conditions of cultivation.

Upper Atmosphere over India.

THE inexpensive type of apparatus for obtaining readings of pressure and temperature at great heights in the upper atmosphere which was invented by the late W. H. Dines in 1907 has been employed in many countries. It has been used with one minor modification at Agra (*Gerlands Beiträge zur Geophysik*, vol. 25 (1930), pp. 266-273, by G. Chatterjee and N. K. Sur).

In Dines's apparatus the graph of each record, temperature and pressure being the ordinates and abscissæ, is traced by a sharp non-rusting steel point on a silvered copper plate little larger than a postage stamp, the motion due to variations of pressure being provided by a small aneroid box and those due to change of temperature by the expansion and contraction of a rod of German silver. Difficulty was experienced at Agra in obtaining a continuous scratch on the recording plate, especially when the sounding balloon carried the instrument into the stratosphere, which is there reached at a higher level than over the British Isles, and is in consequence much colder. It was found that the substitution of a deposit of colloidal graphite on glass, for the silver surface, overcame this tendency, and allowed very sharp records to be obtained with only slight pen pressure.

Owing to the rapidity with which rubber balloons perish in India, Vulpro tissue balloons (see NATURE, vol. 124, p. 793; 1929) were substituted for them in 1926; since then balloons have often risen as high as the stratosphere, and the number of observations obtained permits of a fairly detailed account of the seasonal changes of temperature between the level of the ground and a height of 20 km.

The monsoon season in India (June to September) was found to be decidedly the hottest up to nearly 14 km., and at this season the lapse-rate of temperature is higher between 12 km. and 15 km. than lower down, a state of affairs believed to be due to a difference of origin of the air above and below the average level of the cirrus clouds (12 km.). The base of the stratosphere (the 'tropo-pause') appears to be found at an average height of about 16 km. or 17 km. at all seasons, but its mean temperature has an annual variation with a minimum of 192° A. at about the end of the rainy season. The lowest value obtained at Agra so far is 181° A. at a height of 16.5 km. on Oct. 4, 1928, which equals the lowest yet found—at a slightly higher level—over Batavia in 1923, which for long was regarded as the lowest atmospheric temperature observed anywhere in the world.

'Sea Trout' or 'Bull Trout'?

THE brown trout and the sea trout, possibly members of one plastic species, have been the cause of much controversy. Living under widely varying conditions and possessing very different habits, they show differences in appearance which have given ground for much 'splitting' in the past. Furthermore, because they have come much under the eye of observant anglers, many without the knowledge of a trained biologist, who himself is always in difficulties when deciding where a 'species' ends and where it begins, it is natural that the popular accounts of these fish have shown very divergent opinions. That they are specifically indistinguishable is perhaps the general consensus of opinion at the present day, but there has still been a certain amount of indecision as to where exactly to place the so-called 'bull trout' of the Tweed and other rivers.

A critical examination of the sea trout of the river Tweed* comes therefore as a welcome addition to our knowledge of this interesting species. Mr. G. H. Nall, of the Scottish Fishery Board, has shown that the sea trout of the Tweed exhibit a marked difference from those of many other Scottish rivers in the great rapidity of their growth during sea life. As an example, the average weight of a fish in its third sea summer for the Tweed is 7 lb. 7 oz., as against 3 lb. 5 oz. for the Howmore, 2 lb. 13 oz. for the Ailort, 2 lb. 6 oz. for the Forth, and 2 lb. 3 oz. for the Spey. Similarly, for fish in their fifth sea summer the average weight for the Tweed is 12½ lb. as against the highest of 6 lb. 7 oz. for the Howmore amongst the above four rivers.

* Fisheries, Scotland, Salmon Fish., 1929, No. 5: Sea Trout of the River Tweed. By G. Herbert Nall. (London: H.M. Stationery Office, 1930.) 3s. 6d. net.