A NEW SOLUTION OF THE 10-21 PROBLEM

By S. CHOWLA

(Government College, Lahore)

THE problem[1] is to arrange the numbers $1, 2, 3, \cdots, 21$ in a circle in 10 ways, so that no number has the same neighbours in different arrangements.

Let $(1, 2, 3, \cdots, m)$ denote the arrangement of the numbers $1, 2, 3, \cdots, m$ in a circle, so that 1 has 2 and m as neighbours, 2 has 1 and 3 as neighbours, etc.

The 10 arrangements are as follows :—

  (i) (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21)

  (ii) (2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21)

  (iii) (4, 8, 12, 16, 20, 3, 7, 11, 15, 19, 2, 6, 10, 14, 18, 1, 5, 9, 13, 17, 21)

  (iv) (5, 10, 15, 20, 4, 9, 14, 19, 3, 8, 13, 18, 2, 7, 12, 17, 1, 6, 11, 16, 21)

  (v) (10, 20, 9, 19, 8, 18, 7, 17, 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11, 21)

  (vi) (1, 9, 17, 4, 12, 20, 7, 14, 6, 19, 11, 3, 16, 8, 21, 13, 5, 18, 10, 2, 15)

  (vii) (1, 4, 7, 10, 13, 20, 17, 14, 11, 8, 5, 2, 9, 6, 3, 21, 18, 15, 12, 19, 16)

  (viii) (13, 7, 1, 19, 5, 20, 14, 8, 2, 11, 17, 3, 9, 15, 21, 6, 12, 18, 4, 10, 16)

  (ix) (1, 10, 19, 7, 16, 4, 13, 6, 15, 3, 12, 21, 9, 18, 11, 20, 2, 14, 5, 17, 8)

  (x) (1, 13, 19, 4, 11, 5, 12, 9, 16, 2, 17, 10, 3, 18, 6, 20, 8, 15, 7, 21, 14)

---

[1] The solution given here is simpler than that of Gul Abdulla and Lal Bahadur, *Proc. Indian Acad. Sci.*, (A), 1939, **9**, 103. As far as the author can see the above solution is not a *permutation* of their solution !!