Scan
2 pages
F. R. Bernhart,
letter to ...
add to those
A - numbers

(we already
scanned in more
of his stuff – see
earlier in this binder)

1683
207
296
6342
6343
5043

Corrections /
fall

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DEPARTMENT OF MATHEMATICS

N.J.A. Sloane
Math. Research Center
Bell Telephone Laboratories,Inc.
Murray Hill, New Jersey   07974

Dear Sir:

I own and thoroughly enjoy your handbook of integer sequences. May I
be put on the list of those interested in supplements or updates?

The major monograph of Birkhoff and Lewis (1946) on Chromatic Polynomials
in the AMS Transactions contains three important sequences, only one of
which was thoroughly understood until recently.   I enclose a short
description, giving the references, the explanation of the sequences,
and the formulas that have been found. I also mention a closely related
sequence of the sequence B&L do have a formula for. This sequence of
numbers is very important for the reducibility phase of the solution of
the Four Color Problem.   207

I also have a slight correction to make . Your sequence #942 is the
dissections of an (labeled) n-sided polygon into n-2 triangles. Here,
isomorphism types of these are desired, the effects of dihedral symmetry
must be canceled.   Without canceling the symmetries (using labeled polygons)
it is of course the Catalan sequence   #577.

Your sequence #1325 is quoted from the Oakley/Wisner article in the
Math. Monthly on flexagons. It turns out that each abstract flexagon of
order n is uniquely correlated with an isomorphism type of a triangulated
polygon! This fact is not my own discovery (although I rediscovered it),
but can for instance be found in an unpublished mammoth manuscript by
Conrad & Hartline (while at RIAS in Baltimore) and also the accessible:

    Sidney H. Scott, How to construct hexaflexagons,
      Recreational Math. Magazine, Dec. 1962.

Hence it ought to be sequence #942, not #1325 for flexagons.

The error seems to belong to Oakley and Wisner: they rotated the
dissected polygon, and removed those symmetries, but didn't reflect it,
and also didn't make any statement about their choice. I suggest that
#1325 be retained with new caption "one-sided dissections of polygons"
or "dissections without reflection of polygons" with maybe a similar
qualification for flexagon -- although this would be quite arbitrary for
the latter, since the mirror image of a flexagon map is a map of the same
flexagon, whether or not the flexagon is turned over.

1683

Oh yes, the chromatic sequences if interpolated in the present catalog
would be 1023.x,   1375.x,   and   1385.x. I also see Ron Graham betimes
at Waterloo, and other combinatorics conferences.

                    Sincerely, FRank R. Bernhart

October 17, 1977

Professor Frank R. Bernhart
Mathematics Department
Bloomsburg State College
360 East Third Street
Bloomsburg, Pennsylvania   17815

Dear Professor Bernhart:

Thank you very much indeed for your letter.
I enclose a copy of Supplement I, the only one issued
so far (another is long overdue). Also a couple of
other things that may amuse you.

Thank you for the three new sequences of
chromatic numbers, and the comments on 942 and 1325.
These will all go into the second edition, along with
a great pile of other new material. (What I need is
an aide-de-camp.)

It was very kind of you to write. With
all good wishes.

Yours sincerely,

MH-1216-NJAS-mv   N. J. A. Sloane

Enc.
As above