16/11/38. Proc. Roy. Soc. B. 10/10/38.

A.V. Hill – Article on heat of shortening & dynamic constants of muscle p. 136 – good deal mathematical

J.S. Mitchell. p. 241 – On the erythema curve – Highly mathematical – mentions Sommerfeld's book, Bonnet's second mean value theorem etc.

Scientific American Nov. 38 – Article by P.M.S. Blackett on cosmic radiation p. 246

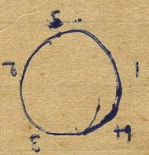
Zs. f. Phys 110 Bd, Heft 7–8: p. 450 – H. Euler: Die Erzeugung Hoffmannscher Stösse durch Multiplikation

---

p. 473 – N.K. Saha – α-teilchen: Refers to Mag & Vandyanathan

---

Heft 9–10: p. 573: S. Tomonaga (student of Heisenberg) – Innere Reibung und Wärmeleitfähigkeit der Kernmaterie – (development of Bohr's theory



---

p. 625. W. Wessel – Zur Theorie des Spins – Shows that

1 2 3 (1,2), (2,1).

0 3 6 $\begin{vmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{vmatrix} + \begin{vmatrix} 6 & 0 & 3 \\ 0 & 3 & 6 \\ 3 & 6 & 6 \end{vmatrix} = \begin{vmatrix} 8 & 3 & 4 \\ 1 & 5 & 9 \\ 6 & 7 & 2 \end{vmatrix}$ ✓

a	b	c	d	g
c	d	g	a	b
g	a	b	c	d
b	c	d	g	a
d	g	a	b	c

x	y	s	t	v
t	v	x	y	s
y	s	t	v	x
v	x	y	s	t
s	t	v	x	y

g	a	b	c	d
c	d	g	a	b
a	b	c	d	g
d	g	a	b	c
b	c	d	g	a

y	s	t	v	x
t	v	x	y	s
x	y	s	t	v
s	t	v	x	y
v	x	y	s	t

$1^2 + 80^2 = \frac{1}{\cancel{82}} \cdot \frac{\cancel{40}\ \cancel{27}^{3}}{9} \cdot \cancel{81} \cdot 161 = 120 \times 161 = 19320$

$1^2 + \cancel{81}^2 = \frac{1}{\cancel{2}} \cdot \frac{\cancel{3}\ \cancel{9}\ 41}{9} \cdot \cancel{81} \cdot \cancel{82} \cdot 163$

~~369 × 41~~

123 × 163

369

738

123

20049 ✓

without any hypothesis other than that of the exchange relations the electron-spin can be deduced from classical considerations.
(If the exchange relations be used where is the classicity?)

Heft. 11–12. p. 692, H. Euler – penetrating component of cosmic ray radiation – Reference to Yukawa particle.

Reviews of Modern Physics: July 1938 – Cosmic ray showers & bursts by D. K. ~~For~~ Froman & J. C. Stearns – goes up to 1938 including Yukon –.

Review of Sc. Instruments Vol 9. No. 10. Oct. 1938. p. 288.
A review of "Introductory Quantum mechanics" by S. Rojansky, Union College, Schenectady, New York – Prentice Hall, Inc, New York, 1938, $5.50

BK
BK

---

p. 299 – A funny review by H. P. Robertson of Dunne's book "The Serial Universe"

p. 303. Review of Einstein & Infeld's book by R. B. Lindsay

0	18	45	72	63	9	36 45	27	54
63	9	36	27	54	0	18	45 36	72
54	0	18	45	72	63	9	36	27
72	63	9	36	27	54	0	18	45
27	54	0	18	45	72	63	9	36
45 36	72	63	9	36	27	54	0	18
36	27	54	0	18	45	72	63	9
18	36 45	72	63	9	36	27	54	0
9	36	27	54	0	18	45 36	72	63

B - (2,7) left cyclic shift on (4,5) by row

2	1	7	4	6	3	9	8	5
7	4	6	3	9	8	5	2	1
6	3	9	8	5	2	1	7	4
9	8	5	2	1	7	4	6	3
5	2	1	7	4	6	3	9	8
1	7	4	6	3	9	8	5	2
4	6	3	9	8	5	2	1	7
3	9	8	5	2	1	7	4	6
8	5	2	1	7	4	6	3	9

(A) - (7,2)

2	19	52	76	69	12	45	35	59
70	13	42	30	63	8	23	47	73
60	3	27	53	77	65	10	43	31
81	71	14	38	28	61	4	24	48
32	56	1	25	49	78	66	18	44
46	79	67	15	39	30	62	5	20
40	33	57	9	26	50	74	64	16
21	54	80	68	11	37	34	58	6
17	41	29	55	7	22	51	75	72

C - nasik

Phys. Zs No. 20, 39. Jahrgang (15/10/38)

P. Jordan. p. 711 – on Genmolekülen – uses quantum methods in biological theories.

Physical Review: Vol. 54, No. 6, 15/9/38

Variational theory of He^4: H. Margenau & W. A. Tyrrell Jr. p. 422.

Coulomb energy of light nuclei – H. A. Bethe, p. 436

p. 480 – Letter by G. Gamow on a tentative theory of novae – tries to explain Zwicky's super-novae – Refers to a critical Chandrasekhar–Landau mass (3.20) having a degenerate electron gas inside.

Ibid (1/10/38). No. 7,

p. 486 – Capture of orbital electrons by nuclei by L. W. Alvarez (Student of Lawrence)

p. 540 – Letter by Oppenheimer & Serber on stability of stellar-neutron cores.

To get Fig. 61(a) of main book

54	27	36	9	63	72	45	18	0
72	45	18	0	54	27	36	9	63
27	36	9	63	72	45	18	0	54
45	18	0	54	27	36	9	63	72
36	9	63	72	45	18	0	54	27
18	0	54	27	36	9	63	72	45
9	63	72	45	18	0	54	27	36
0	54	27	36	9	63	72	45	18
63	72	45	18	0	54	27	36	9

(B) (2,7) right

2	1	7	4	6	3	9	8	5
7	4	6	3	9	8	5	2	1
6	3	9	8	5	2	1	7	4
9	8	5	2	1	7	4	6	3
5	2	1	7	4	6	3	9	8
1	7	4	6	3	9	8	5	2
4	6	3	9	8	5	2	1	7
3	9	8	5	2	1	7	4	6
8	5	2	1	7	4	6	3	9

(A) – (7,2).

56	28	43	13	69	75	54	26	5
79	49	24	3	63	35	41	11	64
33	39	18	71	77	47	19	7	58
54	26	5						

repetitions:

Journ. de Phys – Sr. 7, t. 9, No. 9, Sept 38.

G. Fournet – p. 360 – Regular division of space & structure of matter – (Contains discussion)

S

Journ. Chem. Phys: Oct 38, p. 592

Variation of Raman spectrum of nitrate solns with Cation by E. R. Lairs & F. M. Plesset – Relates to Nedungadi's work

---

p. 645: M. Goeppert-Mayer & A. L. Sklar – Calculations of the lower excited levels of Benzene – these are cal. made on the method of antisymmetrised products of molecular orbitals using group theory methods

---

p. 654 – W. Band on Mayer's theory of condensing systems – talks of deriving general results re Mayer's results from Fowler's general method

---

Helv. Phys. Acta Vol 11, p. 472 – R. Bär on Ultrasonics refers to Parthasarathy & B.V.R (with hypersonics which Sir C.V. says is wrong)

Fig XXII, p. 210 of Rouse-Ball can be split into

6 8 1 6 8 1 1

5	7	3	5	7	3	5	7	3
4	9	2	4	9	2	4	9	2
1	6	8	1	6	8	1	6	8
3	5	7	3	5	7	3	5	7
2	4	9	2	4	9	2	4	9
8	1	6	8	1	6	8	1	6
7	3	5	7	3	5	7	3	5
9	2	4	9	2	4	9	2	4

middle col from below

(i) 2 3 1 4 5 6 9 7 8 (nasik ▲ sym)

(ii) from above 8 7 9 6 5 4 1 3 2 (nasik ▲ sym)

for (i) step is (6,3)

(ii) step is (3,6) going towards left & (6,3) " towards right

1 below

So we can go by rows (a,b) for (A) or (B) & by cols (a,b) for (B) or (A)

27	36	45	72	54	63	9	18	0
9	18	0	27	36	45	72	54	63
72	54	63	9	18	0	27	36	45
27	36	45	72	54	63	9	18	0
9	18	0	27	36	45	72	54	63
72	54	63	9	18	0	27	36	45
27	36	45	72	54	63	9	18	0
9	18	0	27	36	45	72	54	63
72	54	63	9	18	0	27	36	45

B - Step (3,6).

2 3 1 | 4 5 6 | 9 7 8

6 5 4 1 3 2 8 7 9
8 7 9 6 5 4 1 3 2
1 3 2 8 7 9 6 5 4

(3,6)

Ann. der. Phys. Bd. 33, Heft. 3. p. 185. (Picture of G. Mie on his 70th Birthday 29/9/38) (The Mie Number)

ibid. 5. folge, Heft. 4, p. 300. on the integral equation of the skin effect – a critical consideration by F. Lettowsky

ibid Heft. 5, p. 389 – on theory of heavier nuclei II by E. Bagge

---

Proc. Roy. Soc. A 10/10/38.

J. S. Wang p. 56, 68 on Superlattices

G. Temple, p. 122, New systems of normal coords for rel. spheres – Uses Hadamard's methods

---

Summaries: on the H-J. theory & quantisation of a dynamical system Continuum by P. Weiss

ibid – another paper in continuation –

mentions the Born fields as linear case of Mie's theory & Maxwell fields as linear case of Born's theory.

refers to Prange also. ~~Born~~ must be interesting papers

---

72 6
18 153 9
63

9	5	1	8	4	7	3	6	2
3	6	2	9	5	1	8	4	7
8	4	7	5	6	2	9	5	1
9	5	1	8	4	7	5	6	2
3	6	2	9	5	1	8	4	7
8	4	7	3	6	2	9	5	1
9	5	1	8	4	7	3	6	2
3	6	2	9	5	1	8	4	7
8	4	7	3	6	2	9	5	1

symmetric middle row (3,6) does not leads to a magic square

2	5	8	9	3	6	4	7	1
4	7	1	2	5	8	9	3	6
9	3	6	4	7	1	2	5	8
2	5	8	9	3	6	4	7	1
4	7	1	2	5	8	9	3	6
9	3	6	4	7	1	2	5	8
2	5	8	9	3	6	4	7	1
4	7	1	2	5	8	9	3	6
9	3	6	4	7	1	2	5	8

middle row symmetric & result semi magic square

(3,6) → associate semi magic square

6471258 93
9364712 58
5893647 12
1258936 47
4712589 36
3647125 89
8936471 25
2589364 71
7125893 64

(2,7) → 639852174 ... again

(159), (168), (258), (357), (456)

result symmetric semi

3 1 2 | 4 5 6 | 8 9 7 ✓

~~1 2 3 5 6~~ .

3 9 6 | 8 5 2 | 4 1 7 ✓

~~2 1 3 5 5~~

~~2 1 3~~ 4 . 5 . | 6 9 ~~8~~

6 . . | 1 5 9 | 8 . .
. . . | 4 5 6 | . . .
. . . | 2 5 8 | . . .
. . . | 3 5 7 | . . .

2 3 6 | 9 5 1 | 4 7 8 ✓

Proc. Nat. Acad. Sc Vol. 24, No. 9, Sept. 38.

p. 393. Kasner & J de Cicco – Conformal geometry hom L^5

Sc. Papers of Inst. of Phys & Chem. Research Vol. 34. Sept. 38

S p. 991. U. Kakiuma – On the multiple structure of the electron. On p 998, footnote says "In the field of quantum mechanics the difficulties of explaining spin classically have not been set aside. In particular the story of B. S. M. Rao on Born's unitary theory by regarding the electron as a ring-singularity is partially successful, but does not yield a correct result as to the ratio of magnetic to mechanical moment"

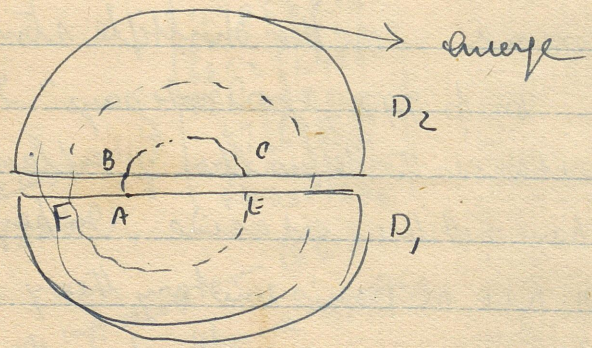
Nature 7/10/38.

p. 649. A. March – Idea of atomic structure of space – Introduces finally nuclear theory – a very interesting article

S

Journ. Franklin Inst: Sept. 38 – Franklin Memorial Volume.

P.T.O



A to B, pot. diff = 50,000 volts. Field of H (magnet) ⊥r to paper. Particle goes from A to B. Thus influence of H describes semi-circle B to C. In this time the electric field is reversed & hence in crossing to D_1 at E energy is still further increased & same time is taken from E to F as from B to C, so on, so on

---

(202)

Interesting lectures by Sir James Irvine, G. D. Birkhoff, F. R. Moulton, G. N. Lewis, T. H. Morgan & other — very interesting number

---

Oct. 1938. Swann's report on Baird found what's work for 1937-38 — again gives a short account of cyclotron* on p. 492

Rend Atti d. Real. Acad. Naz dei Linc vol. 27 — Fas. 11.

p. 537. E. Bompiani — Geometrical research on the Hadamard - Theodoresco method of integration

---

p. 545. G. Lampariello — Dynamical systems of Liouville

Read

Comptes Rendus: t. 207. No. 13 (26/9/38)

p. 526 — on the deflection of the neutrino by J. Solomon

p. 528 — on the transverse electron energy by Guido Beck

No. 14 (3/10/38). J. Shohat — p. 556 — on

2	8	7	1	4	5	6	9	3
9	3	2	8	7	1	4	5	6
5	6	9	3	2	8	7	1	4
1	4	5	6	9	3	2	8	7
8	7	1	4	5	6	9	3	2
3	2	8	7	1	4	5	6	9
6	9	3	2	8	7	1	4	5
4	5	6	9	3	2	8	7	1
7	1	4	5	6	9	3	2	8

middle row
symmetric not natural
(2,7) → magic square associate not natural

3 2 8 7 1 4 5 6 9
5 6 9 3 2 8 7 1 4
7 1 4 5 6 9 3 2 8
3 2 8 7 1 4 5 6 9
5 6 9 3 2 8 7 1 4

(3,6) → not a magic square

3	2	8	7	1	4	5	6	9
4	5	6	9	3	2	8	7	1
2	8	7	1	4	5	6	9	3
5	6	9	3	2	8	7	1	4
8	7	1	4	5	6	9	3	2
6	9	3	2	8	7	1	4	5
7	1	4	5	6	9	3	2	8
9	3	2	8	7	1	4	5	6
1	4	5	6	9	3	2	8	7

middle row symmetric not natural
(4,5) → magic square associate not natural

8	4	1	3	6	2	9	5	1
3	6	2	9	5	1	8	4	7
9	5	1	8	4	7	3	6	2
8	4	1	3	6	2	9	5	1
3	6	2	9	5	1	8	4	7
9	5	1	8	4	7	3	6	2
8	4	1	3	6	2	9	5	1
3	6	2	9	5	1	8	4	7
9	5	1	8	4	7	3	6	2

middle row symmetric not natural
(6,3) does not lead to a magic square

X

Generalised orthogonal polynomials – refers to R. P. Boas (Jr)

No. 15 (10/10/38) – E. Cartan (p. 613. fait hommage à l'Académie des ses « Leçons sur la théorie des Spineurs " $n = 3$, $n > 3$ (notes of A. Mercier) – get this book.

BK

18/11/38.

Phys. Rev. Vol. 54, 1/9/38

p. 367. The Static Interaction of Charged particles by C. D. Thomas: Energy due to two charges on the Born-Infeld theory obtained as

$$e_1 e_2 / r \left[1 - (1/b^2)(e_1^2 + e_2^2)/8r^4 \right].$$

19/11/38: Comptes Rendus (24/10/38), p. 719

Th. de Donder & J. Géhéniau

on Dirac's recent theory – Show how the eqns of Dirac of radiating electron can be alternatively deduced

Phys. Rev. (15/10/38): p. 558. R. C. Williams – on

3	2	6	4	7	9	5	8	1
9	5	8	1	3	2	6	4	7
2	6	4	7	9	5	8	1	3
5	8	1	3	2	6	4	7	9
6	4	7	9	5	8	1	3	2
8	1	3	2	6	4	7	9	5
4	7	9	5	8	1	3	2	6
1	3	2	6	4	7	9	5	8
7	9	5	8	1	3	2	6	4

middle row
Central series (4,5) does not lead to a magic square

n=9

* N.S.N. write what has appeared in the following order

1	4	2	3	5
3	5	1	4	2
4	2	3	5	1
5	1	4	2	3
2	3	5	1	4

n is any even number

6	4	7	1	2	5	8	9	3
9	3	6	4	7	1	2	5	8
5	8	9	3	6	4	7	1	2
1	2	5	8	9	3	6	4	7
4	7	1	2	5	8	9	3	6
3	6	4	7	1	2	5	8	9
8	9	3	6	4	7	1	2	5
2	5	8	9	3	6	4	7	1
7	1	2	5	8	9	3	6	4
8	7	1	4	5	8	6	9	3	2

middle row
magic square

fine structure of H_α & D_α – No mention of my work
(Address: R. C. Williams
Cornell University, Ithaca
New York).

Physica V. No. 9, Oct 38:

p. 797. A. Sokolow – On neutrino theory of light – the paper referred to by Jordan – No mention of my paper. (Address: Physical Technical Institute, Tomsk)

23/10/38 Zbl. f. Math. (31/10/38)

p. 90. My article on ~~Born's~~ Biquaternions extracted by Jordan who says "Im Anschluss an eine frühere Untersuchung des Verf., betreffend die von Weiss begründete komplexe Darstellung der Bornschen Theorie, wird die Watsonsche Darstellung dieser Theorie vermittels Biquaternionen wesentlich erweitert, unter anderem auch in dem Sinne, dass die Infeldsche Verallgemeinerung der Bornschen Theorie mit umfasst wird"

6	9	4	5	3	1	7	8	2
4	5	3	1	7	8	2	6	9
3	1	7	8	2	6	9	4	5
7	8	2	6	9	4	5	3	1
2	6	9	4	5	3	1	7	8
9	4	5	3	1	7	8	2	6
5	3	1	7	8	2	6	9	4
1	7	8	2	6	9	4	5	3
8	2	6	9	4	5	3	1	7

54

Central series is (7,2) does not lead to a magic square.

2	5	4	7	9	6	3	8	1
3	8	1	2	5	4	7	9	6
7	9	6	3	8	1	2	5	4
2	5	4	7	9	6	3	8	1
3	8	1	2	5	4	7	9	6
7	9	6	3	8	1	2	5	4
2	5	4	7	9	6	3	8	1
3	8	1	2	5	4	7	9	6
7	9	6	3	8	1	2	5	4

36

Central series is (3,6) does not lead to a magic square.

X

p. 75: Extract of K. S. K & K. V. I's joint paper by O. Bottema

---

Vyčichlo, František: Interpretazione geometrica della curvatura proiettiva delle curve piane. Boll. Un. Mat. Ital, 17, 75–77 (1938)

proves that this = Cross ratio (T N H I), T = tangent, N = projective normal at $S = S_0$, H = line joining S_0 to the Halphen point of pencil of cubic curves (having contact of order 7 with C) defined by two cubic curves ^1C, ^2C (introduced by the author) & I = line which projects the real inflexion of ^1C of point S_0 "enjeu". (See Bull. Soc. Math. France, 64, 87–98 (1936)

Zs. f. Phys 111 Bd. 1 & 2 Heft (19/10/38)

p. 109: S. Flugge. Über die Bremsung von Neutronen in wasserstoffhaltigen Substanzen

– math. involving integral eqn of Volterra type

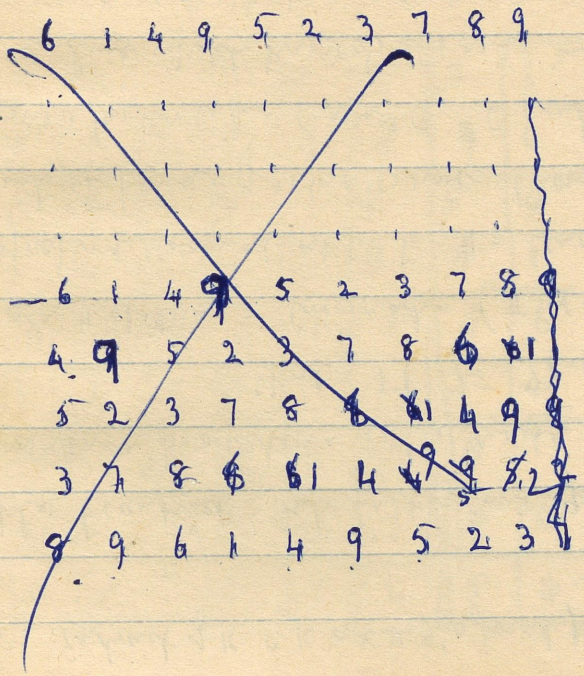
---

p. 125. Th. Neugebauer: Mag. moment der schweren Kerne

36/11/38: Proc. Phys. Math. Soc of Japan: Vol. 20, No. 10

9 1 2 5 7 8 3 4 6
4 6 9 1 2 5 7 8 3
8 3 4 6 9 1 2 5 7
5 7 8 3 4 6 9 1 2
1 2 5 7 8 3 4 6 9
6 9 1 2 5 7 8 3 4
3 4 6 9 1 2 5 7 8
7 8 3 4 6 9 1 2 5
2 5 7 8 3 4 6 9 1

5 1 2 4 3
4 3 5 1 2
1 2 4 3 5 ✓
3 5 1 2 4
2 4 3 5 1



(Inst 26/11/38), p. 795. Seiiti Irie: Sur la détermination de l'intérieur et de l'extérieur de la Courbe de Jordan: – Refers to Venkatachaliengar's work extensively & bases his work on K. V's methods. Calls it: K. V. demontré d'une façon élégante.

Proc. Camb. Phil. Soc. Vol. 34 (Oct 38).

p. 527: W. H. J. Fuchs & P. Weiss – Uniqueness theorems & max-min principle for a type of non-linear partial diff eqns – Bonis eqn – extends Bryce's work.

Read

Phy. Zs: 39 Jahrgang. Nr. 21, (1/11/38)

p. 735: J. Stark: History of axial structure of the electron – Refers to Parson, A. H. Compton & others (No refers to my work)

apply & invites contradiction

Proc. Phy. Soc. London: Vol. 50. Pt. 6 (1/11/38)

p. 947 – S. R. Sawur – A problem in coin tosses Discussion on same by Eddington, Dingle (who makes some humorous remarks) etc.

6	4	1	8	7	5	3	2	9
2	9	6	4	1	8	7	5	3
5	3	2	9	6	4	1	8	7
8	7	5	3	2	9	6	4	1

4	1	8	7	5	3	2	9	6
9	6	4	1	8	7	5	3	2
3	2	9	6	4	1	8	7	5
7	5	3	2	9	6	4	1	8
1	8	7	5	3	2	9	6	4

4	6	9	1	2	5	7	8	3
7	8	3	4	6	9	1	2	5
1	2	5	7	8	3	4	6	9
4	6	9	1	2	5	7	8	3

(3, 6)

1	2	5	7	8	3	4	6	9
4	6	9	1	2	5	7	8	3
7	8	3	4	6	9	1	2	5
1	2	5	7	8	3	4	6	9

Eng Nasik sens: (i) ~~1 2 5 . 1 9~~ 1 2 3 | 5 6 4 | 9 7 8

(ii) 5 2 1 | 7 4 6 | 3 9 8

J. App. Phys : Nov. 1938 : Interesting pictures of nuclear physics apparatus - article on cyclotron

---

Ap. J : Oct, 38, p. 285. W. Baade — on Supernovae — Suggests that the Crab nebula should be identified with a former Supernova (Crab nebula is an emission nebula of the Galaxy). This identification removes a lot of difficulties

p. 369 : Review of Kemble's book by G. H. Shortley — Calls it more rigorous than Dirac & more readable than v. Neumann & more detailed than both.

on cover : 21 photographs (14 x 17) from Yerkes Observatory of celestial objects at $3.00 & $4.00 each

Write for complete information on Yerkes material & Catalogue to

The Univ. of Chicago Press
5750, Ellis Avenue, Chicago, Illinois

Proc. Roy. Soc. A. 168 (7/11/38). p. 389. Pryce : Electromagnetic energy of a point charge. — Paper based on Dirac's previous paper. Also Born wrote about this in the Comm. vol. paper.

(2,5) 1, 2, 3, 4, 5, 6, 7, 8, 9
0, 9, 18, 27, 36, 45, 54, 63, 72 (4,3)

$\frac{4}{2}7(50)$ 175·5

(196)

5	3	4	2	1	7	6
7	6	5	3	4	2	1
2	1	7	6	5	3	4
3	4	2	1	7	6	5
6	5	3	4	2	1	7
1	7	6	5	3	4	2
4	2	1	7	6	5	3

+

21	28	14	0	7	35	42
0	7	35	42	21	28	14
42	21	28	14	0	7	35
14	0	7	35	42	21	28
35	42	21	28	14	0	7
28	14	0	7	35	42	21
7	35	42	21	28	14	0

=

26	31	18	2	8	42	48
7	13	40	45	25	30	15
44	22	35	20	5	10	39
17	4	9	36	49	27	33
41	47	24	32	16	1	14
29	21	6	12	38	46	23
11	37	43	28	34	19	3

1, 2, 3, 4, 5, 6, 7, 8, 9.

nasik

4	2	5	1	3
3	4	2	5	1
1	3	4	2	5
5	1	3	4	2
2	5	1	3	4

3 1 2 4 5 6 8 9 7

3 2 1 4 · 8 · 7 9 2 5 8 1 3

2, 6, 7.

(1, 5, 9), (1, 6, 8), (2, 4, 9), (2, 5, 8), (2, 6, 7), (3, 4, 8), (3, 5, 7), (4, 5, 6).

0, 5, (0, 36, 72), (0, 45, 63), (9, 27, 72), (9, 36, 63), (9, 45, 54), (18, 27, 63), (18, 36, 54), (27, 36, 45)

123|564|978

(0, 45, 63), (9, 27, 72), (18, 36, 54)

(0, 9, 18), (45, 27, 36), (63, 72, 54)

{(1, 5, 9), (2, 6, 7), (3, 4, 8)}, {(1, 6, 8), (2, 4, 9), (3, 5, 7)}

1 2 3 5 6 4 9 7 8 ✓ 2 3 1 6 4 5 7 8 9

123|654|189 3 1 2 4 5 6 8 9 7

23165·7··

231|654|978

4 1 8 7 5 3 2 9 6 symmetric

but not nasik

still (27) has to magic square

Comptes Rendus : t. 207 (2/11/38) No. 18. p. 764. M. A. Kolmogroff
Une généralisation de l'inégalité de Hadamard
entre les bornes supérieures des dérivées successives
d'une fonction — Refers to work of Gorny (Vide K.S.K's)

Nature (5/11/38).
BL: Theoretical Hydrodynamics — L. M. Milne-Thomson
Macmillan & Co, London
(1938) — 31s 6d.

---

p. 843: origin of Mars system — by Dr M. Davidson
Int. remarks about Jupiter's new satellite X.

Science (28/10/38) p. 399. Details of Construction of first building
of Institute of Advanced Study, Princeton at a cost
of $500,000. !

2/12/38: Naturwiss: 26 Jahrgang. Heft 45 (11/11/38)
F. Renner: (Frankfurt a.M). p. 736: Versuch
einer Modelldarstellung der Elementarteilchen:

$$\begin{vmatrix} A & E & D & C & B \\ C & B & A & E & D \\ E & D & C & B & A \\ B & A & E & D & C \\ D & C & B & A & E \end{vmatrix} + \begin{vmatrix} P & R & T & Q & S \\ T & Q & S & P & R \\ S & P & R & T & Q \\ R & T & Q & S & P \\ Q & S & P & R & T \end{vmatrix}$$

(2,3) (3,2)

This is from Ramanujan's note book 1, (see Bk. No. 12, p. 68) – Surely on p. 73 & p. 139 of this same book Ramanujan's gives a fluid scheme for odd n which is the same as (2,3) + (3,2) giving nasik squares.

So instead of bringing Reichmann's rule, one can as well call this.

Ramanujan's scheme.

$$\begin{array}{ccccc} 0 & 5 & 10 & 20 & 15 \\ 20 & 15 & 0 & 5 & 10 \\ 10 & 20 & 15 & 0 & 5 \\ 5 & 10 & 20 & 15 & 0 \\ 15 & 0 & 5 & 10 & 20 \\ 10 & 20 & 15 & 0 & 5 \\ 5 & 10 & 20 & 15 & 0 \\ 0 & 5 & 10 & 20 & 15 \\ 20 & 15 & 0 & 5 & 10 \end{array} + \begin{vmatrix} 3 & 1 & 5 & 2 & 4 \\ 4 & 3 & 1 & 5 & 2 \\ 2 & 4 & 3 & 1 & 5 \\ 5 & 2 & 4 & 3 & 1 \\ 1 & 5 & 2 & 4 & 3 \end{vmatrix} = \begin{array}{ccccc} 3 & 6 & 15 & 22 & 19 \\ 23 & 16 & 5 & 7 & 14 \\ 14 & 23 & 16 & 5 & 7 \\ 9 & 13 & 21 & 20 & 2 \\ 17 & 4 & 8 & 11 & 25 \\ 15 & 22 & 19 & 3 & 6 \\ 10 & 12 & 24 & 18 & 1 \\ 1 & 10 & 12 & 24 & 18 \\ 21 & 20 & 2 & 9 & 13 \end{array}$$

* refers to it as "eingehende Untersuchungen"

$$\begin{array}{ccccc} 3 & & & & 19 \\ & 23 & & 5 & \\ & & 8 & & \\ & 12 & & 18 & \\ 21 & & & & 13 \end{array}$$

gives a reference to my work on the ring-electron *
(Proc. Ind. Acad. Sc., (A) 4, 355 (1936)

Physical Review 54 (1938) (1/11/38) – lots of papers on nuclear physics: see in particular
Hafstad & Teller p. 681. α-particle model of the nucleus. (deals with Bohr's theory)

Breit & Knipp p. 652 – K-electron Capture in Be^7

Margenau & K. G. Carroll, p. 705. Binding energy of Li^6

Rumbaugh, Roberts & Hafstad, p. 657, Nuclear transformations of Li-isotopes

---

Journ. Chem. Phys: Vol 6. No. 11 (Nov 1938)
H. J. Bernstein p. 718 – Calculation of
frequencies of sym. modes of vibration of molecules with various types of symmetry – Heats of Raman

Rule (5) (2,3) + (1,4) + (3,2) + (1,4) + (2,3).

Rule (7). (3,2) + (1,4) + (2,3) + (1,4) + (3,2)

5	1	2	3	4
4	5	1	2	3
1	2	3	4	5
4	5	1	2	3
3	4	5	1	2

does not work

2	4	5	3	1
1	2	4	5	3
4	5	3	1	2
3	1	2	4	5
5	3	1	2	4

(A)

works being a "magic" although reflections exist in diagonals.

2	4	5	3	1
1	2	4	5	3
4	5	3	1	2
3	1	2	4	5
5	3	1	2	4

(A)

+

5	10	15	20	0
10	15	20	0	5
0	5	10	15	20
15	20	0	5	10
20	0	5	10	15

(B)

=

7	14	20	23	1
11	17	24	5	8
4	10	13	16	22
18	21	2	9	15
25	3	6	12	19

(C)

gives an a square different from Fls (9) & (10) as we have obtained on pp 191–93.

no need to try arbitrary middle rows.

Rule (8) is (3,2) + (4,1) + (2,3) + (4,1) + (3,2)

2	3	4	5	1
3	4	5	1	2
1	2	3	4	5
3	4	5	1	2
4	5	1	2	3

does not work

only rules (1), (4), (6), (7) work.

(1) & (4) are complementary

(6) & (7) are complementary

which really amount to only two rules.

Put all this in the Chapter on 5th order squares and along with the Chapter on the N-methods

Effect. Allied to work of Bhagavantham & Venkatarayudu

Annals of Math : 2nd Ser. Vol 39, No. 4 (Oct 1938)

K. Menger p. 794 – Covering theorems of topology

C. Lanczos. p. 842 – Remarkable property of the Riemann-Christoffel Tensor in 4 dimensions

---

J. W. Alexander p. 883 – A theory of connectivity in terms of Groups (Topology)

Nature (12/11/38).

p. 885 – New satellites of Jupiter – $\overline{X}$ & $\overline{XI}$ newly discovered have direct & retrograde motions. (VI), (VII) & (X) are direct at distances of about 7 million miles & (VIII), (IX) & (XI) at about 14–15 million miles. Cosmogonists will find something here on which they can speculate.

(X) is outside Roche's limit.

$(2,3)+(4,1)+(3,2)+(4,1)+(2,3)$

Rule (6) gives F's (9). Try with arbitrary symmetric middle rows:

$$\begin{vmatrix} 5&3&1&4&2\\ 3&1&4&2&5\\ 2&5&3&1&4\\ 1&4&2&5&3\\ 4&2&5&3&1 \end{vmatrix} + \begin{vmatrix} 5&15&0&10&20\\ 20&5&15&0&10\\ 15&0&10&20&5\\ 10&20&5&15&0\\ 0&10&20&5&15 \end{vmatrix} = \begin{vmatrix} 10&18&1&14&22\\ 23&6&19&2&15\\ 17&5&13&21&9\\ 11&24&7&20&3\\ 4&12&25&8&16 \end{vmatrix}$$

(A) (B) (C)

gives an a different from F's (9) but possess F's (10) with cols interchanged. ~~interchanged~~ nevertheless different from F(10)

Try this rule (6) with arbitrary middle rows

$$\begin{vmatrix} 4&1&5&2&3\\ 1&5&2&3&4\\ 3&4&1&5&2\\ 5&2&3&4&1\\ 2&3&4&1&5 \end{vmatrix} + \begin{vmatrix} 20&15&0&5&10\\ 10&20&15&0&5\\ 15&0&5&10&20\\ 5&10&20&15&0\\ 0&5&10&20&15 \end{vmatrix} = \begin{vmatrix} 24&16&5&7&13\\ 11&25&17&3&9\\ 18&4&6&15&22\\ 10&12&23&19&1\\ 2&8&14&21&20 \end{vmatrix}$$

(A) (B) (C')

~~fails being magic~~ semi-magic ✗

We have dealt with rules (1), (4) & (6) which give associated magic squares different from F's (9) & (10) by taking different symmetric middle rows. Rules (2) & (3) don't work. Let us try the remaining (5), (7) & (8) with symmetric middle rows.

p. 865 R.S. awards – Copley Medal to Bohr
Rumford " to R.W. Wood
Hughes " Cockcroft & Walton
Darwin " Bowen

---

p. 857 : A.S. Eve on foundations of Physics – a sort of reply to Stark's article in Nature

---

p. 852 : Duodecimal Arithmetic – (Review of book by G.S. Terry) by E.H.N under heading "Challenge to Zeus"

7/12/38 Math. Zs : Dr. J. Meixner : p. 531, Erzeugende Funktionen der Charlierschen Polynome – (Refers to Watson's paper in J. Lond. Math. Soc)

---

p. 580 : E.A. Weiss – talks of "Trialitätsprinzip"

---

p. 619. Kamke : Eigenwerte bei Randwertaufgaben zweiter Ordnung

---

$\nearrow (1,4)+(2,3)+(4,1)+(2,3)+(1,4)$

Rule (1) works giving Frierson's (10). Try this with arbitrary symmetrical series

$$\begin{vmatrix} 2 & 1 & 5 & 4 & 3 \\ 4 & 3 & 2 & 1 & 5 \\ 5 & 4 & 3 & 2 & 1 \\ 1 & 5 & 4 & 3 & 2 \\ 3 & 2 & 1 & 5 & 4 \end{vmatrix} + \begin{vmatrix} 10 & 20 & 5 & 15 & 0 \\ 5 & 15 & 0 & 10 & 20 \\ 15 & 0 & 10 & 20 & 5 \\ 0 & 10 & 20 & 5 & 15 \\ 20 & 5 & 15 & 0 & 10 \end{vmatrix}$$

(A) (B)

$$\begin{vmatrix} 12 & 21 & 10 & 19 & 3 \\ 9 & 18 & 2 & 11 & 25 \\ 20 & 4 & 13 & 22 & 6 \\ 1 & 15 & 24 & 8 & 17 \\ 23 & 7 & 16 & 5 & 14 \end{vmatrix}$$

(C)

(Q) gives an a different from F's (10) & (9).

Try this with arbitrary series in middle row

$$\begin{vmatrix} 5 & 2 & 1 & 3 & 4 \\ 3 & 4 & 5 & 2 & 1 \\ 1 & 3 & 4 & 5 & 2 \\ 2 & 1 & 3 & 4 & 5 \\ 4 & 5 & 2 & 1 & 3 \end{vmatrix} + \begin{vmatrix} 0 & 20 & 5 & 10 & 15 \\ 5 & 10 & 15 & 0 & 20 \\ 10 & 15 & 0 & 20 & 5 \\ 15 & 0 & 20 & 5 & 10 \\ 20 & 5 & 10 & 15 & 0 \end{vmatrix}$$

(A) (B)

$$\begin{vmatrix} 5 & 22 & 6 & 13 & 19 \\ 8 & 14 & 20 & 2 & 21 \\ 11 & 18 & 4 & 25 & 7 \\ 17 & 1 & 23 & 9 & 15 \\ 24 & 10 & 12 & 16 & 3 \end{vmatrix}$$

(C)

not magic fails in diagonals

Annales de l'Inst. H. Poincaré Vol. 8. Fasc. I. F. Bloch – Le moment magnétique du neutron, p. 63.

Die Phys in neg. Heft 4, 1938

BK: Höhere Math. für den Praktiker: Lorentz's Diff & Int. Calc revised by G. Joos & Kaluza: Göttingen

RM. 24.50

Johann Ambrosius Barth, Verlag, Leipzig

Die p. 32: Report by E. Meyer on Akustik: In Sections. Ultraschall, prominent mention is made of the Raman – Nath theory

---

Comptes Rendus. t. 207. No. 19 (7/11/38).

p III. Books: Gauthier-Villars,

Cahiers Scientifiques – 19 Fascicules about 50 frs each to be obtained

Mémorial des Sc. Math – ~~44 volumes~~ 90 volumes each 20 fr

p. 836. M. Brelot: Sur le potential et les suites de fonctions sous-harmoniques.

[Contd. from Bk. 18, p. 32]:

Modification of Reichmann's step down rules: Rules on p. 31 of Bk. 18

Rule 3: (4,1) + (2,3) + (1,4) + (2,3) + (4,1)

Rule (4): (4,1) + (3,2) + (1,4) + (3,2) + (4,1)

$$\begin{array}{ccccc} 4 & 5 & 1 & 2 & 3 \\ 2 & 3 & 4 & 5 & 1 \\ 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 4 & 5 & 1 \\ 5 & 1 & 2 & 3 & 4 \end{array} \qquad \begin{vmatrix} 3 & 4 & 5 & 1 & 2 \\ 5 & 1 & 2 & 3 & 4 \\ 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 4 & 5 & 1 \\ 4 & 5 & 1 & 2 & 3 \end{vmatrix}$$

(A)

works with rows & cols. off although there is repetition in diagonals. In fact "magic" as ~~this~~ happens in Frierson's cases (9) & (10) of p. 53, Bk. 17 also.

(1,4) + (2,3) + (4,1) + (2,3) + (1,4)

$$\begin{vmatrix} 15 & 20 & 0 & 5 & 10 \\ 5 & 10 & 15 & 20 & 0 \\ 0 & 5 & 10 & 15 & 20 \\ 20 & 0 & 5 & 10 & 15 \\ 10 & 15 & 20 & 0 & 5 \end{vmatrix} \text{ Adding } \begin{vmatrix} 18 & 24 & 5 & 6 & 12 \\ 10 & 11 & 17 & 23 & 4 \\ 1 & 7 & 13 & 19 & 25 \\ 22 & 3 & 9 & 15 & 16 \\ 14 & 20 & 21 & 2 & 8 \end{vmatrix}$$

(B) (C)

This appears same as Frierson's (9) with cols & rows interchanged → nevertheless different ie $c_1 \leftrightarrow c_2$, $c_4 \leftrightarrow c_5$, $c_5 \leftrightarrow c_1$

Try a different (B) with symmetric series in middle row

$$\begin{vmatrix} 20 & 15 & 5 & 0 & 10 \\ 0 & 10 & 20 & 15 & 5 \\ 5 & 0 & 10 & 20 & 15 \\ 15 & 5 & 0 & 10 & 20 \\ 10 & 20 & 15 & 5 & 0 \end{vmatrix} \text{ (A)+(B')} \rightarrow \begin{vmatrix} 23 & 19 & 10 & 1 & 12 \\ 5 & 11 & 22 & 18 & 9 \\ 6 & 2 & 13 & 24 & 20 \\ 17 & 8 & 4 & 15 & 21 \\ 14 & 25 & 16 & 7 & 3 \end{vmatrix}$$

also a

(B')

and different from Frierson's (9) & (10)

p. 842 : G. Badareau : Brillouin-Wentzel methods & applic of Whittaker's function.

---

p. 853 : P. Ehrenfest Jr et Andrée Freon : on heavy electron. Calls them "mésotons".

18/12/38: Zbl. f. Math. 19 Bd. H. 3, (19/11/38)

Amer. J. math: 60, 555-560 (1938) : H. Lewy : A property of spherical harmonics. — The author proves the existence of a zero (0,0,0) of the Hessian of a spherical harmonic etc —

Bull Amer. Math. Soc 44, 548-557 (1938). J. W. Green — A property of harmonic functions in three variables

---

P. Urban : Ann. d. Phys. V. F. 32, 471-488 (1938) — Eigenvalues in wave mechanics.

Nature : (26/11/38), ~~p. 8~~

Review of Dr Rachevsky book "Math. Biophysics" by D'Arcy W. Thompson —

BH

(p. 841)

Whole of Chap I of C.M is nothing but I.D.M generalised only Chaps II, III, ~~IV~~ etc with bimagic & trimagic squares appear new — Also IV – VII contain miscellaneous results.

C.M. is advanced re-Bi & tri-magic squares. [Also see ref. in Traitchitton multimagic squares]

Lozenge squares from p. 166. — Square is lozenge for $(a,b) = (-m, m)$, B.M $(0,-1)$ and (i,j)

6	1	8
7	5	3
2	9	4

RM $(-1,1)$

8	1	6
3	5	7
4	9	2

RM $(1,1)$

18	22	1	10	14
24	3	7	11	20
5	9	13	17	21
6	15	19	23	2
12	16	25	4	8

RM $(2,2)$

It also works for $(m,m) = (a,b)$

$a + a' = 0$, $b + b' = -1$.

$a' = -m$, $b' = -(m+1)$

$i = (1 - a - a')m$

$= (1 - m + m)m = m$ ✓

$j = (1 - b - b')m$

$= (1 - m + m + 1) = 2m$ ✓

(i,j) depends only on the break move $(a+a', b+b')$. ~~Suppose we take (a,b)~~ whatever (a,b).

& if B.M is $(0,-1)$, square is associated. Take break move $(2,1)$. Square is associated

24	15	1	17	8
5	16	7	23	14
6	22	13	4	20
12	3	19	10	21
18	9	25	11	2

allright but not lozenge. Even nos cut the uncopt square.

$\frac{1}{2}n(n^2+1) = \frac{1}{2}(2m+1)(4m^2+4m+2)$

$= (2m+1)(2m^2+2m+1)$. odd.

$n^2+1 = 4m^2+4m+2 =$ Even, so that complements of odd nos. are odd and of even numbers even

p. 948: Extract from Electrotechnics – mention of "K. Srinivasan's thoughtful address"

Books || H. A. Bauer "Grundlagen der Atomphysik (Springer, 12.60 R.M) 1938

BK

O. Köhler u C. Calov: Math. Raum-bilder – 24 Plastoreoskopdrucke (nach patentiertem Verfahren hergest) mit erkl. Text (Berlin Dreyer & Co 1938) 4 R.M

Exh ||

W. Peppler – Druckübertragung an geschmierten zylindrischen Gleit- und Walzfächen (V.D.I – Forschungsheft 391) Sup. Roz. 8 vo, Pp. 24 + 10 plats (Berlin V.D.I. Verlag. G.m.b.H, 1938) 5 R.M

Exh ||

Vallée Poussin – Potential theory – Actualité Series 578 15 fr

BK ||

H. Steinhaus – Mathematical snapshots. pp. 136 New York, Leipzig, London & Paris G. E. Stechert & Co, 1938

Exh ||

---

p. 955. D. M. Wrinch – Letter on "Crystal analysis & point sets"

00 11 22, 33, 44, 55, 66, 77, 88, 99, 1010,

23 34 45 56 67, 78, 89, 910, 100, 01, 12

46 57, 68, 79, 810, 91, 102, 02, 13, 24, 35

69 710, 80, 91, 102, 03, 14, 25, 36, 47, 58

21 81. 92, 103, 04, 15, 26, 37, 48, 59, 610, 70

27 104 05, 16, 27, 38, 49, 510, 60, 71, 82, 93

17 28, 39, 410, 50, 61, 72, 83, 94, 105, 06

310 40, 51, 62, 73, 84, 95, 106, 07, 18, 29

52 63, 74, 85, 96, 107, 08, 19, 210, 30, 41

75 86, 97, 108, 09, 110, 20, 31, 42, 53, 64

98 109, 010, 10, 21, 32, 43, 54, 65, 76, 87

0 12 24 36. 48. 60 72, 84, 96, 108, 120 sums to 660

$\frac{1}{2} \cdot \frac{\cancel{121}^{11} \cdot \cancel{122}^{61}}{\cancel{11}} \to 671$

$\frac{1}{2} \cdot \frac{\cancel{120}^{60} \cdot \cancel{121}^{11}}{\cancel{11}} = 660.$

25 + 37 + 49 + 61 + 73 + 85 + 97 + 109 + 110 + 1 + 13 = 660 ✓

119 + 10 + 11 + 23 + 35 + 47 + 59 + 71 + 83 + 95 + 107 = 660 ✓

0 + 25 + 50 + 75 + 89 + 114 + 18 + 43 + 57 + 82 + 107 = 660 ✓

so if p is a two-digit prime say 11, then if $r_1 = 11$, $10r_1 = 1010$.

ie there will be 4 digits also if $r_2 = 23$, $7r_2 = 310$

& so on for higher primes. Anyway it looks ugly there being more than 2 digits

So the 11th order square is (no need to write in full.)

0 to 1 is (−2, −1), 1 to is (−2, −1)
sum up to 10, ie RM is (−2, −1)

from 10 to 11 is (1, 0)
21 to 22 is (1, 0)
32 to 33 is (1, 0)
ie BM (1, 0)

$a + a' = 1$
$b + b' = 0$

$a(a, b) = (-2, -1)$, $ab' - a'b = 1$
$(a', b') = (3, 1)$ $a \pm b = -3, -1$
$a' \pm b' = 4, 2$

all prime to n

Hence nasik only $l(i) = (0, 10)$

Tarry's mean. al series is 3-D.M. generalised

Science (25/11/38)

p. 491 – Macdonald Observatory of Univ. Texas – 82" mirror to be made – at present secondary.

p. 8 of Science News – on collapsed neutron stars & Supernovae

---

Proc. Roy. Soc A Vol. 168, No. 935, (25/11/38)

p. 519 – N. Arley – on Cosmic rays

Abstracts: G. Temple – on Southwells "Relaxation methods" S. 134

Phys. Rev Vol. 54, No. 10, (15/11/38)

p. 809 – Bardeen & Feenberg – Symmetry effect in spacing of nuclear energy levels

---

p. 841 – K. S. Krishnan & Mukherjee – 3rd paper on mag. anisotropy

---

p. 846. Lyddane & Herzfeld – on lattice vibrations & in polar crystals – (Imp. paper)

p. 862, Bethe, p. 867 – Exact soln of Lorentz' pair of Δ^s by W. B. Cartmel – Curious paper

---

Chap I - Séries numérales de base p (p premier), Carrés panmagiques de ôre p.

(413)

1234 ~~00~~ $1 \times 413 + 2 \times 321 + 3 \times 234 + 4 \times 142$

$= 413 + 142 + 142 + 413 = 000$ // 000

321

4523. $4 \times 413 + 5 \times 321 + 2 \times 234 + 3 \times 142$

$= 142 + 000 + 413 + 321 = 321$ //

25 125

$5^4 - 1$ 624.

$r_1 = 23$], 00, 23, 41, 14, 32

4012 ~~0~~ $32 + 00 + 14 + 14 = 00$

$r_2 = 12$ → 00, 12, 24, 31, 43

00, 23, 41, 14, 32, ~~120~~ //

12 (base 5)

24

31

43

0, . . 8. (r_1, r_2, s_1, s_2) 0, . . 26.

$p = 3, n = 2, (p^2)$ $(r_1 r_2)$, $p = 3, n = 4$, $p = 3^3$. p^2, $3^2 = 9$ //

0 r_1 $2r_1$,

r_2

$2r_2$

$p \to (r_1 r_2)$, $p^2 \to (r_1 r_2 s_1 s_2)$, $p^3 \to (r_1 r_2 r_3 s_1 s_2 s_3)$, $p^4 \to (r_1 r_2 r_3 r_4 s_1 s_2 s_3 s_4)$

$p = 11$, $r = 21$ 21 42 63 84 105

~~$a \times p$ 110 + b~~ 00, 11 22 33 44 55 66 77 88 99

~~$11 \times 10 + b$~~

~~110 + 10~~ $p = 13$,

(120)

Trans. Amer. math. Soc : ~~Oct~~ Nov, 38.

p. 563 – 5-body problem by W. L. Williams of Chicago

J. Frank. Inst : Nov. 1938

p. 575 – Interesting article by L. W. Nordheim on "barytron" (Yukon) & discussion by Swann

Lectures at the Chicago Cosmic ray Symposium, June 29–30, 1938

Bk. R. Klee – Über die einfachen Konfigurationen der euklidischen u. der projektiven Ebene – Dresden: Focken & Oltmanns, 1938, R. M. 3, 67. S u 44 Fig

Ent ||

Bk H. M. S. Coxeter – 59 Icosahedron – 20 beautiful plates (Toronto, Univ. of Toronto press, $1)

Ent ||

P. Finsler & H. Hadwiger. Comment. math. helv. 10, 316–26 (1938)

Einige Relationen im Dreieck

Bk || Diff. u. Int. rech: by O. Haupt & G. Aumann in 3 vols, real analysis, Diff & Int.

Bk ||

bimagic & panmagic: $m^2 = (p^\alpha q^\beta \ldots t^\lambda)^2$

$(0111 \quad 1012 \quad 3320 \quad 2101)_{p^\alpha q^\beta \ldots t^\lambda}$, $p, q \geq 2$

Chap. VII — Series numerales mixte — Magic à diverses degrés — Espace magique à k dimensions.

Examples: (i) $(11\ 23)_p$ gives panmagic squares for all values of $p \geq 5$

$$\begin{pmatrix} r_1 & r_2 \\ s_1 & s_2 \end{pmatrix}_{p,q} \text{ or } \begin{pmatrix} r_2 & r_1 \\ s_2 & s_1 \end{pmatrix}_{p,q} \quad , p, q \geq 5$$

with $r_1 = 1100$, $s_1 = 2300$

$r_2 = 0011$, $s_2 = 0023$

give "des carrés magiques sous-diagonaux (?) et panmagique de côté pq"

The smallest panmagic that one can construct in this fashion is that of order 35

with $p, q = 5, 7$ or $7, 5$

(ii) $(11, 12)_3$ gives a semi-magic square of order 3. Taking $r_1 = 1100$, $s_1 = 1200$ and $r_2 = 0011$, $s_2 = 0012$ we get a semi-magic square of order $3q$, $q \geq 5$. If one adds the number 21 to each term of $(11, 12)_3$, the square becomes a 3-magic & similarly adding 2100 to each term of $(r_1 s_1)_3$, the square becomes magic of order $3q$

(iii) An example of bimagic square of order $3^2 \times 2^3 = 72$. — Gives only one compartment (Fig. 31, p. 167)

(iv) Fig. 35, example of a magic square of order 12 with compartments of order 3 also magic (Ref. to some other book of Kraitchik)

Let us look at Chap I more carefully.

prices, R.M, 11.20, 9.80, 10.60.

Tech. Phys of U.S.S.R. Vol 5. No. 6 (1938) — on amorphous state — No. XIII — Kobeko, Kuvshinski & Shishkin

---

Phys. Zs. Nr. 22, 39 J. (15/11/38)
Stark & Verleger. p. 763 — again on axial structure

BK P. Jordan — Die Phys. des 20. Jahrh. (Friedr Vieweg & Sohn R.M. 4.80 (5.90, geb).

BK

J. de. Phys Ser. 7, t. 9, no. 10 (oct 38)
p. 403. F. Joliot et. I. Zlotowski — formation of a stable isotope of mass five of helium (He^5!) by collision of He^4 & deuterons

---

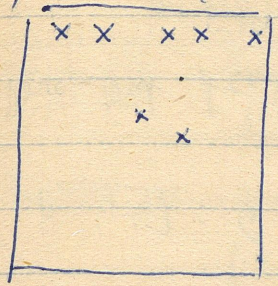
p. 457: G. Petiau — on Dirac electron

Proc. Nat. Acad. Sci Vol 24, No. 11, Nov. 38
p. 519. R. Courant — Introductory note to a big paper on Plateau's problem

---

46 02 35 | 4032x
25 | 45 56 60
15 41 04 | 25
53 64 05

00, 34, 61, 25, 42 — 03624 ~~15 51~~ 13, 0 — ~~04152~~ 36 — 04152 — 36 — 183 — 3, 6 — 1 3 — 6 3



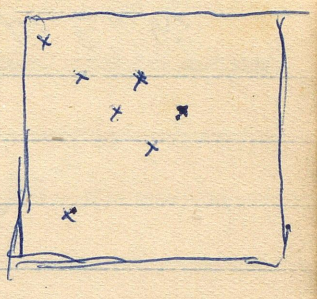
00, 11, 33, 44, 66, 25, 52 is another constellation

$0+8+24+32+48+19+37 = 168$ ✓

00, 34, 61, 25, 42, 13, 56.

$= 0+25+43+19+30+10+41 = 168$ ✓

& So on.



But what is the total number? In 5th order square the number was $2\cdot 10 + 4\cdot 25 = 120 = 5!$

Here for order 7, we should have $2\cdot 14 + n\cdot 49 = 7(7n+4)$. If this equals $7!$ in analogy with case $p=5$, we find no integral value of n. — Leave it at that

---

Chapter VI. Numeral series for composite base m — magic squares of order m^n of degree n.

§ 73 — Examples

$m = 3\times 5$, $(11\ 114)_{15}$ — semi-magic

magic & pan magic:

order $m = 5\times 7$ — $(11\ 312)_{35}$

order $m = p\times q$ — serie type $(11\ 23)_{pq}$ p & $q \geq 5$

order $m^2 = p^2q^2$. " $(1111, 1012, 1001, 0210)_{pq}$, p & $q \geq 3$

" $m^2 = p^3q^3$ " $\begin{pmatrix} 001101 & 010011 & 101010 \\ 100010 & 101000 & 010101 \end{pmatrix}_{pq}$, p & $q \geq 2$.

Poincaré Int. Ann : Vol 8. Fasc 2 & 3 – Ewald on Crystal optics & another on probability

---

Comptes Rendus. t. 207. No. 20 (14/11/38)
p. 910. J. Solomon – Statistical theory of nuclei
Mentions Thomas – Fermi statistics (C.V. Raman referred to this as a suggestion !)

Nature (19/11/38) p. 916. Letter of D. S. Kothari on a lower limit to energy ~~generation~~ evolution in stellar matter (Refers to Bethe & Critchfield.

28/12/38 : Math. Annalen. Bd. 116. Heft 2 (26/11/38)
p. 157. Van der Waarden on O. Holder.
p. 181. G. Bradistilov : on n-fach Pendel.
p. 281. W. Fröhlich : Second paper on Zöpfe
Journal de Math : t. 17 (1938) – Jubilee volume of J. Hadamard.

Jahrbuch. Fort. Math. Bd. 63, (1937). Heft 4.

~~00, 11, 55, 66~~ ~~34, 34, 56, 01, 25, 42, 64~~ ~~00, 11, 33, 25, 44, 56, 60~~

Let us take $p = 7$ & consider the constellations given by $(11, 23)_7$

00	11	22	33	44	55	66
23	34	45	56	60	01	$\boxed{12}$
46	50	61	02	13	24	35
62	03	14	25	36	40	51
15	26	30	41	52	63	04
$\boxed{31}$	42	53	64	05	16	20
54	65	06	10	21	32	43

The rows & diagonals (cols & call) satisfy C. M's condn of sets of 1st digits & 2nd forming the series 0, 1, — 6.

we have to choose other such terms.

The reason ~~for~~ why the 1st & 2nd digits should form the set 0, 1, — p-1 is that the sum of the terms should equal $C_1 = S$.

~~3 4 5 6 | 4, 5, 6, 0~~
~~0 1 2 | 3, 4, 5~~

~~6 0 1 | 5 2 3~~
~~2 | 5~~
~~3 4 5 | 0 1 2~~
~~(1,3)~~

00	33	66
	25	
54	10	43

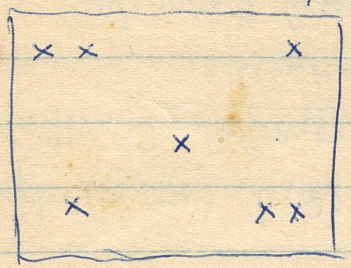
0, 3, 6, 2, 5, 1, 4 ✓
0, 3, 6, 5, 4, 0, 3 ✗

00		66
	25	
54		43

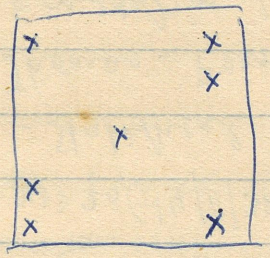
06254
06543 (1,2)

11 / 32 12 / 31

Two such are given by 00, 11, 66 in first row, 25 in centre and 54, 32, 43 in bottom row, and 00, 66 in 1st row, 12 in 2nd row, 25 in centre, 31 in sixth row, 54, 43 in last row



one constellation for $n = 7$



another constellation

Using the two adjoining constellations

$\frac{1}{2} \cdot 48 \cdot 4 \cdot 7$ $\quad 24 \times 7$ $\quad 168$

These terms in decimal notation are 0, ~~40~~, 8, 48, 19, 39, 23, 31 summing to 168 ✓
0, 48, 9, 19, 22, 39, 31 " 168 ✓

p. 525 : E. B. Escott : Rapid method of extracting square root
Amer. math. monthly 44, 644-46

Introduce in identity $\frac{x+2}{x-2} \Big/ \frac{x^3-3x+2}{x^3-3x-2} = \left(\frac{x+1}{x-1}\right)^2$

$$x_{n+1} = x_n^3 - 3x_n$$

and multiply for $n = 1, 2, 3, \ldots$ the resulting eqs with one another obtains for $n \to \infty$ the ∞-product

$$\sqrt{\frac{x_1+2}{x_1-2}} = \left(1+\frac{2}{x_1-1}\right)\left(1+\frac{2}{x_2-1}\right)\left(1+\frac{2}{x_3-1}\right)\cdots$$

which can be used for approximate calculating of root

A. Ostrowski : Articles on Newton's method of approximation
p. 527

A. Steinitz-Laguë – C.R. 2me Congr. internat. Récréation math
Paris 1937, 29-37

Ek

Les formes géométriques dans la nature – Significance of logarithmic spiral & the Fibonaccischen numbers for certain questions of plant morphology

---

Take for eg. the ~~m~~ nasik square:

20	22	4	6	13
9	11	18	25	2
23	5	7	14	16
12	19	21	3	10
1	8	15	17	24

18
5 7 14
21
(magic series)

11 25
7
19 3
(magic series)

4
23 7 16
15
(magic series)

20 13
7
1 24
(magic series)

~~M5 V12 184~~

~~20, 12, 7, 1, 24~~
~~9, 11, 13, 14, 18~~

$(11, 23)_5$

	r_1	$2r_1$	$3r_1$	$4r_1$
00	11	22	33	44
s_1 23	34	40	01	12
$2s_1$ 41	02	13	24	30
$3s_1$ 14	20	31	42	03
$4s_1$ 32	43	04	10	21

(A)

$\begin{bmatrix} 30124 \\ 41302 \end{bmatrix}$ $\begin{bmatrix} 04132 \\ 04321 \end{bmatrix}$

$\begin{bmatrix} 24130 \\ 21304 \end{bmatrix}$

12340
30124

$\begin{bmatrix} 40123 \\ 02341 \end{bmatrix}$

Other than the orthogonal & diagonal constellations 20 in numbers, the ~~cross-sections~~ cross-like constellations of Kraitchik are defined in C.M (p. 137) as those ~~numbers~~ 5 terms whose first ~~digits (last~~ (last) digits form the series 01234 in any order. ~~The constellations~~ These 5 terms refer to the numeral series $(11, ab)_p$ with $ab = 23$ for $p = 5$. This numeral series written ~~above~~ above as in (A) ~~also~~ gives the identity of Kraitchik's & C.M's definitions of constellations.

Thus if a cardboard with holes corresponding to cross-constellations forces

o
o o o
o

is placed anywhere on the nasik square the corresponding terms occupied by the holes form a constellation.

Exh. C. A. Richmond : Amer. math. Monthly 44, 33-35. Repeating designs in surfaces of negative curvature
Talks of a model also

Exh

Zs. f. Phys: Bd. 111. 3 & 4 Heft: (14/11/38)
p. 186. Wave mechanical 2 centre problem by N. Svartholm (Hyllraas & Klein's student)

Zs. f. Ap. Bd. 16, 5 Ht (12/11/38)
p. 297. Pritam Sen on Kothari's work

Zs. f. tech. Phys: Nr. 11 (1938)

Proc. Roy. Soc. A Vol. 169, No. 936 (6/12/38)
p. 102 & 119. P. Weiss - two articles rather obscure

President's Address - references to N. Bohr

Ap. J. Nov. 1938 : G. P. Kuiper, p. 472 — on the

p. 116 – obtains a trimagic square of order 9 which is tramagic in the diagonals and diameters (?). This square is obtained from the square (p. 171 of this note book) by transpositions of rows suitably done.

p. 119 – Gives the huge square of order ~~[illegible]~~ 27 (covering one full page) written in decimal notation which is associated, bimagic and magic in compartments (of 9), and having its diagonals and its medians (?) trimagic

Chap. V – Miscellaneous Topics

(1) Squares magic in rectangles

Ex of an 8th order square in which ~~every~~ all possible rectangles of 2×4 ~~of all possible~~ numbers have their ~~has its~~ elements summing up to $C_1 = 252$ in figure below.

This is also a nasik square.

0	7	52	51	44	43	24	31
63	56	11	12	19	20	39	32
1	6	53	50	45	42	25	30
62	57	10	13	18	21	38	33
2	5	54	49	46	41	26	29
61	58	9	14	17	22	37	34
3	4	55	48	47	40	27	28
60	59	8	15	16	23	36	35

Quite remarkable

Due to Mortier (Revue Scientifique, 1903, 1 p. 662)

(2) Constellations – According to Kraitchik p. 175 (figs 53a & 53b) these constellations are 120 in number

(Constellation is any set of n numbers that form a ~~se~~ magic series)

mass-luminosity relation.

---

p. 516. on the integration of eqn of radiative transfer
by P. Swings & L. Dor
(thanks given to S. Chandrasekhar)

Ann. dr. Phys. Bd. 33 (Heft 7) (15/11/38)
70th Birthday of Sommerfeld.
p. 565 – Top model of electron by H. Hönl
(Stuttgart)

Naturwiss (2/12/38) – Biographical notice of Sommerfeld
by M. Planck, p. 777
Very interesting

Science (2/12/38) p. 522. Vita Universitaria mentions
dismissal of Levi-Civita & Enriques as
in the list of 100 Professors dismissed

Nature (3/12/38). Review of Unsölds books – good model
p. 975 for reviewing Smart's book

§ 60. Theorems on auto-complementary series

§ 61. Classification of magic squares

(i) distinct – not obtainable by reflexions & rotations

(ii) complementary – Each element replaced by its complementary

(iii) Independent = distinct, not complementary & not obtainable by interchange of rows & cols.

Independent squares are distinct, but converse not necessarily true.

§ 62. Squares of order 2^n.

I order 2^3 – Smallest possible bimagic square is of this order (ie 8). – of these there are ten types which are also eulerian & panmagic & bimagic in 4 diagonals

30	9	39	48	61	42	4	19
56	47	1	22	27	12	34	53
13	26	52	35	46	57	23	0
43	60	18	5	8	31	49	38
2	21	59	44	33	54	24	15
36	51	29	10	7	16	62	41
17	6	40	63	50	37	11	28
55	32	14	25	20	3	45	58

order 8 – Bimagic

Check of this be bimagic in diagonals

IV order 2^6 (64) appears to be the smallest bimagic square of 2^n – Gives the number series for this & gives a reference to Bruno who got this in decimal notation

p. 992 ; 3 letters by Blackett, Rossi & Wick on the 'mesotron' on Euler-Heisenberg postulate of heavy electron decaying radio-actively – Wicks a non-technical letter explaining surely $\rho = \hbar/mc$ (ρ = nuclear range, m = mass of mesotron) by using Uncertainty Principle

---

1/1/39. Zbl. f. Math. 19 Bd (1/1/38), Heft 4

Vinogradov I.M. Eine neue Methode der analyt. Zahlentheorie (Arb. d. Inst. f. Mathematik V.A. Steklov. H. 10) Leningrad u. Moskau: Verl. Akad. d. Wiss. U.S.S.R, 1937, 122 S

BK

---

p. 161. K.S.K's paper on fin. limits- extracted by J.D. Tamarkin

---

E. Feldheim: Resolution of certain eqns (functional) by means of Hermite's polynomials Bull. Sci. math II.S. 62, 124–28 et 133–39 (1938)

Ch. IV – Squares of order p^{th} and p^n inferred – Magic n-magic & panmagic – Extension of magic & diabolism.

§ 59 – Examples of magic squares of several degrees.

I Squares of order p^3.

~~a) p = 2 (p = 1),~~

(i) The smallest trimagic square possible is for $p = 7$ (order $7^3 = 343$) [not given directly by a numerical series]

(ii) $p = 11$, the square given by the numerical series

$$\left(\begin{matrix} 111111, & 123456, & 221133 \\ 222333, & 212121, & 300221 \end{matrix} \right) / 13$$

is trimagic and panmagic & this is the smallest value of p which gives a trimagic square directly by a numerical series.

II Squares of order p^4. – Given examples of

(i) $p = 2$, trimagic, bimagic in rows & magic in compartments;

(ii) $p = 3$, trimagic & panmagic, trimagic in rows; (Can be made also bimagic in diagonal)

(iii) $p = 5$, semi-trimagic and panmagic

(iv) $p = 17$, trimagic and panmagic & 4th-degree magic in rows given by

$r_1 = 11224455$, $s_1 = 22223113$

$r_2 = 12345678$, $s_2 = 24192419$

$r_3 = 78421121$, $s_3 = 21343581$ (base 17).

$r_4 = 11111111$, $s_4 = 22233345$

E. Sperner: Zur Begründung der Geometrie im begrenzten Ebenenstück (Schr. Königsberg. gel. Ges. Naturw. Kl. Jg. 14, H. 6) Halle a. d. S.: Max Niemeyer, 1938, 23 S., R.M. 2.40

BH
BK

J. A. Schouten & D. J. Struik: Einführung in die neueren Methoden der Diffgeom, 2. vollst. umgearb. Aufl. Bd. 2, Geometrie Von D. J. Struik (Groningen: P. Noordhoff N. V. 1938, R.M. 16).

BH
BK

K. Reidmeister: Topologie der Polyeder u. Komb. Topologie der Komplexe (Math. u. ihre Anwendungen in Monogr. u. Lehrbüchern Begr. v. E. Hilb. Hrsg v E. Kamke. Bd. 17) Leipzig. Akad. Verlagsges. m. b. H. 1938, R.M. 13.20

BH
BK

Bull. Acad. Sci. math et nat. (Belgrade) A. No. 4 (1938) p. 177. A. Bilimovitch: on a special linear canonical transformation

Read

III. To construct a trimagic square of order p^2, having in its central cell a given number m (between 0 and p^2-1).

For series $(r_1 r_2 s_1 s_2)_p$, Choose a t such that

$$\frac{p-1}{2}[r_1+r_2+s_1+s_2]+t \equiv m \pmod{p}.$$

Now if all the elements of the square be increased by t, the resulting square has m in the central cell. The addition of t to each element does not alter the magic or trimagic property.

Simple proof given, but since Tarry's numerical series theory is not understood, the proof also is not understood.

Chap III. Carrés de côté p^3 – Trimagie et panmagie.

§ 34, p. 93.

Tarry's magic square of order $53^3 = 148,877$ which is "trimagic and panbimagic" – To develop it with this square in full at an average of 2 cm per term would require an extent of 3 kilometers!

The terms of this square are given by

$r_1 = 111111$	$s_1 = 222333$
$r_2 = 123456$	$s_2 = 241147$ (base 53)
$r_3 = 112252$	$s_3 = 224\,6101$ (Trimagic & nasik)

The series $S = (r_2+s_2\ r_3+s_3)_p = (3645913\ 3368155)_{53}$

satisfies the conditions in order that the series of the second order should be bimagic

Physica V. No. 10. Dec 38, p. 961

M. Schönberg – 2nd Paper on Relat. Commutation Rules in quant. theor. of fields

---

Nature (10/12/38)

p. 1015. Review by E. C. Stoner on Auwers's book on magnetism

p. 1016 " of Castelnuovo's Collected works – Remarkable tribute paid to his geometric work – Cf. the remark " It has been said that the modern geometry of Curves was born under the arcades of Via Po, Turin, the fruit of conversations between the two young mathematicians – Segre & Castelnuovo "

---

p. 1019 – Atmosphere of Planets by H. Spencer Jones (Astr. Royal)

8/1/39: Ann. Soc. Sc. de Bruxelles Sr I. t. 58 (1938) (12/12/38)

p. 166. Sur quelques formules de la géom. ds. mass by M. J. Becqué (about C. R., M. I. etc Ref. to Whittaker, Appell, Routh)

II. Construire un carré bimagique de côté p^2, tel que, dans tous les compartiments de côté p qui le constituent, la somme des 2es puissances des p^2 termes soit égale à la constante bimagique C_2.

The series $(0122, 2101, 1101, 0221)_3$

gives bimagic series satisfying these conditions. Shown in fig. 18, p. 67 of C.M. on p. 62 of C.M. mentions 3 series giving bimagic squares viz

$(0111, 1012, 2201, 2110)_3$

$(0122, 2101, 1101, 0221)_3$

$(2101, 0112, 1021, 2120)_3$

of these fig. 14, p. 63 leads to our fig. on p. 171 obtained from the 3rd of the above gives a bimagic square.

What is mentioned above satisfying the conditions of compartmented elements with squares summing to C_2, is given by the 2nd of the above series.

For fig. 18, p. 67 C.M.

$0^2+17^2+22^2+64+78^2+59^2+47^2+34^2+39^2$

$= 0+289+484+4096+6084+3481+2209+1156+1521$

$= 19320 = C_2$

[This can be called a Jaina bimagic square

Put in my Ch VI]

For elements in 1st compartment (left top)

$0^2+17^2+22^2+37^2+51^2+32^2+74^2+61^2+66^2$

$= 289+484+1369+2601+1024+5476+3721+4356$

$= 19320 = C_2$. Similarly we can verify sums of squares of elements in the other compartments

calculate energy of acceleration

Tech. Phys. U.S.S.R. Vol 5, No. 7 (1938) ✓

p. 525: Method of solving the fundamental problem of Electrostatics & Related problems by G. Grünberg

Says "there is no need to have recourse either to theorem of "uniqueness of soln" nor to "method of images". Attention is drawn to the eqns (35) & (35') for density of charge induced on a conducting sphere placed in an arbitrary external field which the author claims are given for the first time & their derivation by any other method would be less simple

Article to be read carefully

~~Zeit. Vol 5, No 8~~

J. de. Phys Ser. 7, t. 9. No. 11 (Nov 1938)

J. Solomon, p. 479: Gravitation et Quanta

Very interesting paper

$17^2 + 22^2 + 37^2 + 51^2 + 32^2 + 74^2 + 61^2 + 66^2 = 289 + 484 + 1369 + 2001 + 1024 + 5476 + 3721 + 4356$

$= 24\,720$

Our figure on p. 171 is obtained from adding 0001 & then changing to decimal notation adding 1.

Fig. 16, p. 66 of C.M. gives is the one obtained whether from Fig. 14, p. 63 without adding 0001 & then changing to decimal notation. Then Fig. 17 is obtained from Fig. 16 by turning all 3×3 compartments through 90°.

0 64 47	14 75 31	25 62 42
34 17 78	36 19 56	50 3 67
59 39 22	70 53 6	72 28 11
69 52 8	74 27 10	58 41 21
13 77 30	24 61 44	2 63 46
38 18 55	49 5 66	33 16 80
48 4 68	35 15 79	37 20 54
73 29 9	57 40 23	71 51 7
26 60 43	1 65 45	12 76 32

(A) Fig. 16 (C.M.) p 66

59 34 0	70 36 14	72 50 25
39 17 64	53 19 75	28 3 62
22 78 47	6 56 31	11 67 42
38 13 69	49 24 74	33 2 58
18 77 52	5 61 27	16 63 41
55 30 8	66 44 10	80 46 21
26 73 48	1 57 35	12 71 37
60 29 4	65 40 15	76 51 20
43 9 68	45 23 79	32 7 54

(A') Fig 17 (CM), p. 66.

Bimagique $C_2 = 19320$

Magique $C_1 = 360$.

Infact, if 3×3 compartments of Fig. on 171 is turned through 90° we can also verify that the resulting square is magic. Referring to that figure we have $58+36+2+72+38+13+74+49+27 = 369$

~~24+80+46+8+55+33+10+69+44 =~~

$41+16+66+52+21+77+30+5+61 = 369$

$24+80+46+8+55+33+10+69+44 = 369$

for the first three rows of the transformed figure

$S_2 = 20049$

$S_1 = S = 369$

Similarly remaining rows & cols & diagonals can be verified

Article by A. Sokolow at M. H. A. Prysee (Nature, 1938, 141, 976-77)
Which is this?

Nature (24/12/38) p. 1109. Ref. to Royal Inst. discourse on Feb. 10 by Max Born "one of the most distinguished of the refugee men of science"

15/1/39: Proc. Phys-Math. Soc Japan Vol 20, No. 11, Nov 38 p. 912. K. Husimi - Partitio-Numerorum as occurring in a problem of nuclear physics — The work of Uneda verified & extended

---

Let $p_m(n)$ = no. of ways in which a given natural number n can be written as a sum of exactly m natural numbers. Uneda's result is that mean number of excited particles in Bohr's theory is

$$\bar{m}(n) = \sum_{m=1}^{n} m p_m(n) \Big/ \sum_{1}^{n} p_m(n)$$

is exactly given by empirical formula

$$\bar{m} = n^{2/3} \qquad \text{(true to } n = 100\text{)}$$

(2) The series $(0111, 1012, 3320, 2101)_p$

represents a bimagic square which is also nasik for every value of $p \geq 5$, except $p = 11$.

(3) The series $(0111, 1010, 1011, 0101)_p$

$(0111, 1001, 1011, 0110,)_p$

$(0111, 1100, 1110, 0011)_p$

give nasik magic squares for every value of $p \geq 2$.

§ 29 of C.M., p. 65 - Diverse problems

I To construct a bimagic square of order p^2 such that, if all the compartments of order p are turned in the same sense through 90°, the resulting square is magic.

Ex: The square bimagic square given by

$(2101, 0112, 1021, 2120)_3$

satisfies this condition.

This is exactly the square of Fig. 14, p. 63 of C.M.

Husimi examines by by Analysis & finds as 1st result

$$\overline{m} = \frac{1}{\beta}\log\frac{1}{\beta}\,,\quad \beta = \frac{\pi}{\sqrt{6n}}$$

Contradicting Uhler's conjecture & showing it valid when n is relatively small. Husimi uses method of steepest descent for the above result

More rigorously he gets

$$\overline{m}(n) = \frac{1}{\beta}\left(\log\frac{1}{\beta}+C\right) + \frac{3}{\pi^2}\log\frac{1}{\beta} + \frac{3}{\pi^2}(C+1) + \tfrac{1}{4} + O\left(\frac{1}{\sqrt{n}}\right)$$

C = Euler's constant

J. Math & Phys. Sept. 38 – C. Lanczos on Trig. Interpolation

Phys. Rev: Vol 54, No. 11 (1/12/38). (Sommerfeld number 70th birthday)

Articles by Wentzel, Heitler*, Stueckelberg, Ewald, Pauling, Laporte, Kentzfeld & Zeller, Brillouin, Pöschl, Eckart, Pauli, Rubinowicz, Condon, Landé, Farah Froehlich, London F, Bethe

Ind no

Also letter by P.M.S. Blackett

(iii) 0000, 0111, 1100, 1011
1110 1001, 0010, 0101
0011 0100, 1111, 1000
1101, 1010, 0001, 0110

→

1	8	13	12
15	10	3	6
4	5	16	9
14	11	2	7

Jaina nasik.

So ~~we~~ no need to add 0001. Is this also one of squares on p. 173 for $n=9$.

Without adding 0001, let us just check up the first row. This gives

1, ~~9~~, 51, ~~71~~, 6, ~~53~~, ~~64~~, 8, 46, ~~69~~ → 369.

which are the elements of the last row of the 7th sq. on p. 174.

So there appears to be no need to add 0001 except to obtain the 4th order square bimagic in the diagonals: ~~This~~ diagonal bimagic squares, ie 7th sq. 15 (i) & (ii) on p. 63 of C.M (ie Carr's magics) adding 1 become

2	11	7	14
13	8	12	1
16	5	9	4
3	10	6	15

(i)

2	13	7	12
11	8	14	1
16	3	9	6
5	10	4	15

(ii)

Note that (i) & (ii) are both associated but not nasik or Jaina. & also diagonally bimagic //

---

§ 28, p. 64 of C.M – other results.

(1) The series $(0122, 2101, 1101, 0221)_3$ which gives a bimagic square for $n=9$ ($p=3$) gives a bimagic square for all $p \geq 3$ (except $p=5$), and semi-nasik for $p > 3$.

J. de Phys t. 9, No. 12, Dec 38

In Bibliography my papers on hyperatomics & neutrino theory extracted

---

J. Chem. Phys Vol 6, No. 12, Dec 38 — A big number

Proc. Roy. Soc. A Vol. 169, No. 937 (22/12/38)

Bakerian Lecture by C.K. Ingold on "Benzene" — good deal of Raman spectrum

---

abstracts of papers: Born & Fuchs on Fluctuations in electromagnetic Radiation (Rec 5/12/38) — Wave fluctuations are here recalculated for a quantised electromagnetic field, & it is shown that the result coincides with the statistical formula as far as can be expected, provided one overlooks the divergence of the zero energy. The importance of this ∞ is discussed w.r.t the question of the limitations & future improvement of the present radiation theory

---

We have obtained (from Ball) in Fig. 61 (main book) such an associated nasik square of $n = 9$. [This is to be tested anyway, what is meant by a central compartment?]. In Fig on last page the central 3 x 3 compartment is magic with $S = 123$]

Also gives on p. 63 three types of nasik squares for $p = 2$ ie $n = 4$ viz

$(0111, 1010, 1011, 0101)_2$, $(0111, 1001, 1011, 0110)_2$ & $(0111, 1100, 1110, 0011)_2$
(i) (ii) (iii)

(i)

	r_1	r_2	r_2+r_1
0000	0111	1010	1101
1011	1100	0001	0110
0101	0010	1111	1000
1110	1001	0100	0011

→

2	7	12	13
11	14	1	8
5	4	15	10
16	9	6	3

after adding 0001 & forming over to 1-81 & not 0-80

This is a Jaina square (also nasik)

4
196
225
9
434

256
16
169
442

(ii)

0000

1	8	11	14
12	13	2	7
6	3	16	9
15	10	5	4

without adding 0001, one also sets a nasik magic square which is also Nasik & also Jaina

(Wrong [illegible] repeats 4 ask for repeats)

* Komagome, Hongo, Tokyo

$\frac{1}{6}\cdot 16\cdot 17\cdot 33$ 11 $\frac{1}{4}\cdot 8\cdot 11\cdot 17$ 18 374 $\frac{1}{6}\cdot 5\cdot 9\cdot 17$ $\frac{1}{6}\cdot 15\cdot 16\cdot 31$

$\frac{40+31}{4} = 31$

(ii)

0000	0111	1001	1110
1011	1100	0010	0101
0110	0001	1111	1000
1101	1010	0100	0011

→

1	8	10	15
12	13	3	6
7	2	16	9
14	11	5	4

Jaina nasik

Proc. Imp. Acad (Japan): Vol 14, No. 9: Nov 38

p. 325. K. Yano — on Einsteins-Bergmanns new Unitary theory

Sc. papers of the Inst. of Phys & Chem. Research*: No. 851-859 Nov, 1938.

p. 1643. S. Tomonaga & M. Kobayasi — Scattering & Splitting of photons on Born's non-linear theory

---

Comptes Rendus t. 207, No. 24 (12/12/38)

pp. 1171 — 1182, Articles by J. Solomon, Géhéniau, Cabrera, Roubaud-Valette, Marie-Antoinette Tonnelat, M. A. Proca on heavy electron etc

---

Science (9/12/38) p. 6. of Science News on "Mesotron"

~~The seemingly~~

Mesotrons are much more reduced in intensity in passing through air than through equivalent amount of dense lead. This difference, according to

Adding 0001, changing to decimal notation & adding 1, we have

2	49	72	4	54	65	9	47	67	✓
79	12	32	75	14	34	~~50~~ 77	16	30	✓
42	62	19	44	55	24	37	60	26	✓
38	58	27	40	63	20	45	56	22	✓
7	48	68	3	50	~~8~~ 70	~~43~~ 5	~~43~~ 52	66	✓
78	17	28	80	10	33	73	15	~~29~~ 35	✓
74	13	36	76	18	29	81	11	31	✓
43	57	23	39	59	25	41	61	21	✓
6	53	64	8	~~37~~ 46	69	1	51	71	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

'4
6241
1764
1444
49
6084
5476
1849
36
22947
+20049

not bimagic

verified ~~panmagic~~ nasik

In fact we have got one 9th order nasik already from Ball & this is another one.

Yet another one can be got from $(0120, 1001, 1002, 0220)_3$.

It is also mentioned that if 0201 is added to each term of this series, one obtains the curious panmagic magic square or a compartment central magique — what he means is I think an associated square because adding 0201 to central element 1210 we get 1111 = 40 (without addition of 0001) which becomes 41 ie central element

(recently confirmed from Ball)

Also taking the diagonally opp. elements 0000 & 2120, adding 0201 these become 0201 and 2021 which → 20 and 62 adding to 82. Similarly 0011 & 2112 lead to 24 and 58 adding to 82.

Prof. Rossi*, can now be easily accounted for on the disintegration hypothesis (Euler-Heisenberg)

- The seemingly queer disintegration of a single atomic particle is explained by saying that the mesotron breaks up into an electron and into a neutrino with the original heavy mass of the mesotron appearing in its offspring as great Kin. energy

---

(16/12/38): p. 555: Selenology & Cosmogeology by Dr H. L. Fairchild

- Very interesting article on origin of solar system lunar system etc

---

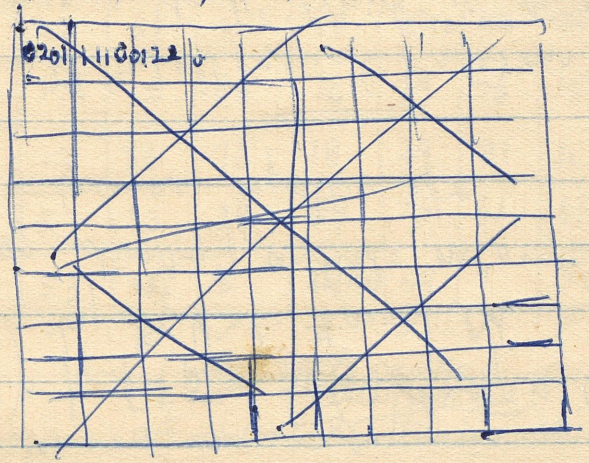
p. 562. Ø Intellectual Freedom: note about Nazi Science & Stark's article in Nature

p. 564: Death of J. Pierpoint reported on 9/12/38 aged 72.

p. 571. Report on Int. Congress of mathematicians at Camb. Mass on 4/9/40.

for $p=3$ & $n=4$ states that if r_2 or s_2 has two zeros, it is not possible to have a bimagic square, but such terms can lead to 4 nasik squares. Gives two examples $(0120, 1001, 1002, 0220)_3$ and $(1212, 0012, 2222, 1100)_3$ — verify one of them to be nasik but not bimagic. Take the second.

	0,	r_1	$2r_1$	r_2	r_2+r_1	r_2+2r_1	$2r_2$	$2r_2+r_1$	$2r_2+2r_1$
	0000,	1212,	2121,	0012,	1221,	2100,	0021	1200,	2112
s_1	2222								
$2s_1$	1111								
s_2	1100								
s_2+s_1	0022								
s_2+2s_1	2211								
$2s_2$	2200								
$2s_2+s_1$	0021								
$2s_2+2s_1$	0011								



1210 + 0201 = 1111 ; 1211 + 0201 = 1112

0201 + 0011 = 0212 ; 20 + 62 = 82

2120 + 0201 = 2021 ; 2112 + 0001 = 2010 ; 58 + 24 = 82

	r_1	$2r_1$	r_2	r_2+r_1	r_2+2r_1	$2r_2$	$2r_2+r_1$	$2r_2+2r_1$
0000	1212	2121	0012	1221	2100	0021	1200	2112
s_1	2222	0101	0010	2201	0110	1022	2210	0122	1001
$2s_1$	1111	2020	0202	1120	2002	0211	1102	2011	0220
s_2	1100	2012	0221	1112	2021	0200	1121	2000	0212
s_2+s_1	0022	1201	2110	0001	1210	2122	0010	1220	2101
s_2+2s_1	2211	0120	1002	2220	0102	1011	2202	0111	1020
$2s_2$	2200	0112	1021	2212	0121	1000	2221	0100	1012
$2s_2+s_1$	0122	2001	0210	1101	2010	0222	1110	2022	0201
$2s_2+2s_1$	0011	1220	2102	0020	1202	2111	0002	1211	2120

p. 8 of Science News : on Theory of atomic particles

Advt on p. II : Inst of Math. & Stat. research
55, West 42nd St, New York, N.Y
We perform numerical computations, interpret, analyse data & prepare tables, diagrams & prepare them for publication!

11/2/39 Zs. f. ang. Math u mech : Bd. 15, Heft 6, Dec 38

p. 343. A. Knesehke : Zur Theorie der Wirbelbewegung

Erth Entdeckung p. 366. Drei Filme über konforme Abbildung von Helmut Heinrich in Breslau

Einzelheiten über den Aufbau der Filme, auf die hier nicht eingegangen werden kann, können leicht aus den Veröffentlichungen der R.f.d.U (Reichsstelle für den Unterrichtsfilm in Berlin)

method of making films also given

Zbl. f. Math. (11th Jan 1939, Bd. 19. Heft 5)

BK BK || R.D. Carmichael : Intro to theory of groups of finite

(to be reviewed for Math. Student)

1st	Lower diagonal	Upper diagonal
4	4	625
1296	256	784
3364	576	4489
5041	5329	2601
	3969	3969
	4624	144
	1521	5476
	2809	25
	961	1936
	20049	20049

So this wonderful 9 x 9 magic square is bi-magic & the method of finding it using "series numerale" is really very fine, specially putting it in the compact form

$(2101, 0112, 1021, 2120)_3$.

Obviously "Carrés magiques" is quite an advanced treatise.

Other wonderful examples of magic squares of order p^n

(1) order 49 which is nasik & bimagic ~~are~~ given by Tarry

$(1111, 2351, 5432, 1133)_7$

(2) order 25 which are also nasik & bimagic

$(1111, 1234, s_1, 2112)_5$ with $s_1 = 2323$ or $2401, 3201, 4013, 4032$

and $(1111, 1234, 3322, 3113)_5$.

(3) order 25 which are bimagic but not nasik

$(1111, 1234, 3412, 3223)_5$

$(1111, 1234, 4231, 3223)_5$

$(1111, 1234, 1403, 2133)_5$

of finite order. Boston, Ginne. & Co, 1937, pp 447, $5

BM: Hardy – Pure math (7th Edn), 1938. Specially enlarged & completed. Adds in 2 chapters on Derivatives & Integrals & Addn Theorems – Many new & interesting problems added; also some up to date critical remarks on foundation difficulties. It is delightful to read how a great analyst is talking to "Cannibals" whose math. background has, of course, very much improved since 1st Edn (1908). For this improvement Hardy's book is greatly responsible (Szegö)

---

p. (215) Max. Coral: A generalisation of a property of harmonic functions

---

p. " méthode de balayage = sweeping out process

BM: G. Sugier: Alg. Corresp. (1,1), (2,1), (2,2). Paris. Libr. Vuibert. 173 pp, 36 fr

---

p. 240. Reviews of two books of J. Yvon* (Actualités scientifiques

58, 36, 2, 72, 38, 13, 74, 49, 27 sum to 369

$[(\text{Total}) = 27a + 9b + 3c + d]$

[illegible]

(neither a nor n, but only b,m)

2	66	46	13	77	33	27	61	44	→ 369
36	16	80	38	21	55	49	5	69	→ 369
58	41	24	72	52	8	77	30	10	→ 369
71	54	7	73	29	12	60	40	23	→ 369
15	76	32	26	63	43	1	65	48	→ 369
37	20	57	51	4	68	35	18	79	→ 369
50	6	67	34	17	81	39	19	56	→ 369
75	28	11	59	42	22	70	53	9	→ 369
25	62	45	3	64	47	14	78	31	→ 369
↓ 369	↓ 369	↓ 369	↓ 369	↓ 369	369	369	369	369	→ 369

2nd row	3rd row	5th row	6th row	4th row
1296	225	2500	625	
256	5776	36	3844	
6400	1024	4489	2025	
1444	676	1156	9	
441	3969	289	4096	
3025	1849	6561	2209	
2401	1	1521	196	
25	4225	361	6084	
4761	2304	3136	961	
20049 ✓	20049 ✓	20049 ✓	20049 ✓	
3rd row	6th row	7th row	4th row	
3364	1369	5625	5041	
1681	400	784	2916	
576	3249	121	49	
5184	2601	3481	5329	
2704	16	1764	841	
64	4624	484	144	
5476	1225	4900	3600	
900	324	2809	1600	
100	6241	81	529	
20049 ✓	20049 ✓	20049 ✓	20049 ✓	

$2^2 + 66^2 + 46^2 + 13^2 + 77^2 + 33^2 + 27^2 + 61^2 + 44^2$

4

4356
2116
169
5929
1089
729
3721
1936
20049

1
4225
2025
144
5776
1024
676
3600
1849
19320

$C_2 = \frac{1}{9} \cdot 27 \cdot 41 \cdot 163$

163 × 123
489
326
163
20049

$1^2 + -+ 81^2 = \frac{1}{6} \cdot 27 \cdot 41 \cdot 163 \;\|\; 0^2 + 1^2 + -+ 80^2 = \frac{1}{6} \cdot 40 \cdot 27 \cdot 81 \cdot 161$

$C_2 = \frac{1}{9} \cdot 40 \cdot 27 \cdot 161$

$= \frac{1}{9} \cdot 40 \cdot 27 \cdot 3 \cdot 161$

40 × 483
19320
20049 ✓

1932

To verify, add up 1st, 2nd, 4th, 5th, 6th, 7th row and 3rd row
All 9 results found correct

Quart. Jour of Math Vol. 9, No. 36, Dec 38

p. 246. Love: Electrostatic problems

p. 259. K. Mahler: Minkowski's theory of red^n of +^ve def quad form

p. 283: G. Temple — on Lorentz-transformations (refers to Milne's suggestions)

Proc. Phys.-Math. Soc. Jap: Vol 20, No. 12 (Dec 38)

p. 977. T. Nagakura — Reaction between light nuclei

ZS. f. Phys. 111 Bd (5 & 6 Heft) (8/12/38)

p. 292. Zur Quanten Elektrodynamik by K. F. Novobatzky

Phys. ZS. Nr. 2, 40th J. (15/1/39)

p. 70 Review of Courant-Hilbert II by C. F. v. Weizsäcker

Die Physik: Heft 1. 1939

p. 1. G. Wentzel*: Quantentheorie & Wave mechanicks 2.

$1^2+65^2+48^2+15^2+75^2+32^2+26^2+63^2+43^2$

1
4225
2304
225
5776
1024
676
3969
1849
20049

That gives some idea of Tarry's numeral series.

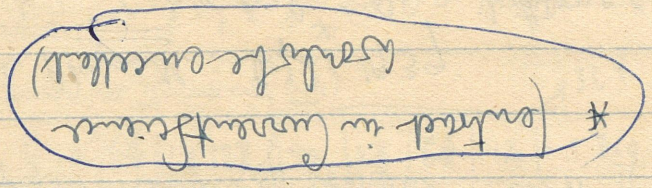


Fig. 14, p. 63 is formed from the series $(2101, 0112, 1021, 2120)_3$.
Adding 0001 to each term, ~~and transforming to decimal not.~~ Fig 14 becomes

0001, 2102, 1200, 0110, 2211, 1012, 0222, 2020, 1120
1022, 0120, 2221, 1101, 0202, 2000, 1210, 0011, 2112
2010, 1111, 0212, 2122, 1220, 0021, 2201, 1002, 0100
2121, 1222, 0020, 2200, 1001, 0102, 2012, 1110, 0211
0112, 2210, 1011, 0221, 2022, 1120, 0000, 2101, 1202
1100, 0201, 2002, 1212, 0010, 2111, 1021, 0122, 2220
1211, 0012, 2110, 1020, 0121, 2222, 1102, 0200, 2001
2202, 1000, 0101, 2011, 1112, 0210, 2120, 1221, 0022
0220, 2021, 1122, 0002, 2100, 1201, 0111, 2112, 1010.

This transformed into decimal notation gives 9th order magic square with elements 0 to 80. Scarring I reject the normal 9th order square. The square thus obtained is bimagic. Il y a lieu de remarquer que la panmagie ne peut être obtenue dans la carrés bimagique de côté p^2, pour $p = 3''$. This is not natural.

Physica VI. no1. Jan 1939

p. 33. R de L. Kronig – Mechanism of paramagnetic relaxation

p. 82: Letter by P. M. Clay on penetrating component of cosmic radiation (Euler-Heisenberg)

Phys. Rev 54 (1938), Dec 15

p. 1048. Korff – on binding energy of O^{16}

p. 1053 Rarita & Slawsky: Nuclear 2-body variational problem

p. 1055. Motz & Teenberg: Spacing of energy levels in light nuclei

p. 1113: letter on fine structure of H_α (no mention of my work)

Nuovo Cimento. Anno 15 – N. 7

p. 429: Bohr's address (master) on Biology & Atomic-Physics *

Also Bohr on Rutherford.

(Galvani centenary celebrated)

$(1011\ 0111\ 1101\ 1110)_2$ $\quad (r_1 r_2)_2$

$r_1 \quad r_2 \quad s_1 \quad s_2$

~~0000 1011 0111 1100~~

0000 1011

0111 1100.

$0, r_1; 0, r_2, r_1 + r_2$

$0 + 2r_2$

~~0111~~ $\frac{11}{7}$ 18.

1011

0111 0010

$10 = (abcd$

$a \cdot 2^3 + b \cdot 2^2 + c \cdot 2 + d.$

$8a + 4b + 2c + d = 10$

$= 6$

12

0001	1010	0110	1101
1100	0111	1011	0000
1111	0100 ~~1000~~	1000 ~~0101~~	0011 ~~1110~~
0010	1001	0101	1110

1100

1011

0001

1010

1010

0001

1001

11, 7, 13, 14

~~0000 1001 0101 1100~~

~~1011 0110 1010 0001~~ 1111

~~1110 0011 0111 0010~~

~~0001~~ 1000 0100 1101

0000 1011 0111 1110

1101

111

1011

0111

1100

1011

0001

15(i)

	0	r_1	r_2	r_1+r_2
0	0000	1011	0111	1100
s_1	1101	0110	1010	0001
s_2	1110	0101	1001	0010
s_1+s_2	0011	1000	0100	1111

Adding 0001

0001	1010	0110	1101	1, 10, 6, 13
1100	0111	1011	0000	12, 7, 11, 0
1111	0100	1000	0011	15, 4, 8, 3
0010	1001	0101	1110	2, 9, 5, 14

fig. 15(i)

15(ii)

	0	r_1	r_2	r_1+r_2
	0000	1101	0111	1010
s_1	1011	0110	1100	0001
s_2	1110	0011	1001	0000
s_1+s_2	0101	1000	0010	1111

$+0001 \rightarrow$

0001	1100	0110	1011
1010	0111	1101	0000
1111	0010	1000	0101
0100	1001	0011	1110

$=$

1	12	6	11
10	7	13	0
15	2	8	5
4	9	3	14

fig 15(ii)

J. of App. Phys Vol 10. No. 1 (Jan 1939).

p. 3. Pure Phys begets app. Physics

---

p. 14. Notice of Nobel award to Fermi (very interesting) (1937)

---

p. 17. Einstein to be Chairman of World Fair Committee

J. Frank. Inst. Dec 38.

p. 757. What are Cosmic rays. W. F. G. Swann

BM p. 824: Review of Starcraft by N. H. Barton Jr & S. M. Joseph pp. 228 N.Y. McGraw Hill, 1938, $2.50

3/3/39 (Founder's Day at Ind).

Zbl. f. Math 19 Bd (6/2/39).

p. 243. Review of Datta & Singh's Book Vol 2, by O. Neugebauer

A. Erdélyi: J. Lond. Math. Soc, 13, 154-56 (1938) – Watson's expansion of $L_m^{(k)}(z)\, L_n^{(\alpha)}(z)$ extended

---

Typ. 15 as given are ~~as~~ (in decimal notation with nos 0 to 15).

1	10	6	13
12	7	11	0
15	4	8	3
2	9	5	14

1	12	6	11
10	7	13	0
15	2	8	5
4	9	3	14.

* $C_3 = 4\left(\frac{1}{2}\cdot 15\cdot 16\right)^2$
$= \frac{1}{16}\cdot 16^2\cdot 15^2 = 16\cdot 225$
$= 3600$

64 | 196 | 8
121 | 13
169
8^{11}

These are given as examples of 4th order magic squares ~~tri~~ not nasik & trimagic in the diagonals with $C_1 = 30 = S$.

$$C_2 = 1^2+7^2+8^2+14^2 = 2^2+4^2+11^2+13^2 = 310$$

$$C_3 = 1^3+7^3+8^3+14^3 = 2^3+4^3+11^3+13^3 = 3600$$

1	8
343	64
512	1331
2744	2197
3600	3600

In decimal notation with nos. 1 to 16 we have squares as in previous page

with $C_1 = S = 34$, $C_2 = 2^2+8^2+9^2+15^2 = 3^2+5^2+12^2+14^2 = 374$.

$C_2 = \frac{1}{4}\cdot\frac{1}{8}\cdot 4^2\cdot 17\cdot 33$
$= 374$
$C_3 = \frac{1}{4}\cdot\left[\frac{1}{2}\cdot 16\cdot 17\right]^2$
$= \frac{1}{16}\cdot 16^2\cdot 17^2$
$= 68^2 = 4624$

$C_3 = 2^3+8^3+9^3+15^3$
$= 3^3+5^3+12^3+14^3$
$= 4624$

8	27
512	125
729	1728
3375	2744
4624	4624

Mention that for $n = 4$, magic square cannot be ~~ma~~ trimagic & the utmost possible is given by the above two squares trimagic in the diagonals

Also shows that for $p = 3$ i.e. $n = 9$, it is not possible to have a trimagic square which is also nasik.

F. Leja : Sur une famille de fonctions harmoniques liées à une fonction donnée dans un intervalle, Ann. Soc. Polon. math 17, 1-7 (1938

Actualité Series. Nr. 571 – Notion of Capacity by F. Vasilesco

Bk. Nr. 578. Potential theory by Vallée Poussin

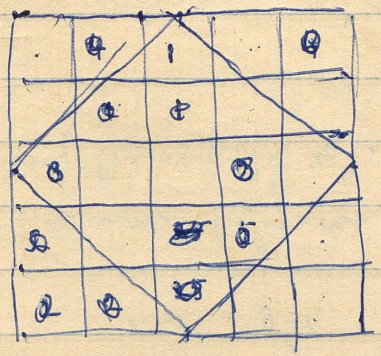
A. Liénard : J. École polytech III. S. 144, 35-158 & 176-226 (1938)
– A problem on harmonic functions

C. R. Acad. Sci. Roum, 2, 440-43 (1938) – N. Mirón : The only continuous soln of fn eqn

$$\int_{x-r}^{x+r} \int_{y-r}^{y+r} u(\xi,\eta)\, d\xi\, d\eta = 4r^2 u(x,y)$$

is a harmonic polynomial of fourth degree not containing any terms with x^4, x^2y^2, y^4

$n = 5$



Let $(i, j) = (2,3)$ ie as in Western method.

For associated square

$2 = (1-a-a')2$, $3 = (1-b-b')2$

ie $a + a' = 0$, $2(b+b') = -1$.

This is impossible since $2(b+b')$ is even while -1 is odd. So no associated square possible

Try $RM = (-2,2)$. — Fails after element 4

" $RM = (-1,2)$, BM must be $(1,0)$, or $(0,-1)$, or $(1,-1)$. — Nowegthere work.

$RM = (2,1)$ ×, $(2,-1)$ ×, $(-2,-1)$ ×, $(-2,-1)$ ×

$RM = (1,-2)$ ×. So it looks as if another lozenge is possible for $(i,j) = (2,3)$.

Carrés magiques (Conto). — Chap. II. — Carrés de côté p^2 — Bimagique et panmagique.

$p = 2$; $C_1 = 30$; ~~$\frac{1}{2}(n-1)\{(n-1)^2+1\} = \frac{1}{2}(n-1)(n^2-2n+2)$~~ $\frac{1}{2}n(n^2+1)$.

with ~~$n = 4$, $\frac{1}{2}$~~ $\frac{1}{2}\cdot 15\cdot 16 = 120/4 = 30 = C_1$

$\frac{1}{6}\cdot 15\cdot 16\cdot 31 = 40\cdot 31$, $C_2 = \frac{31\cdot 40}{4} = 310$

p. 63. Fig. 15.

with nos 1 to 16 →

2	11	7	14
13	8	12	1
16	5	9	4
3	10	6	15

2	13	7	12
11	8	14	1
16	3	9	6
5	10	4	15

$C_1 = 5 = 34$

$C_2 =$

4
121
49
196
370

169
64
144
1
378

4
64
81
225
374

$\frac{1}{6}\cdot 8\cdot 17\cdot 33$
34×11

9
25
144
196
374

Bull. Amer. math. Soc. 44, 520-23 (1938) : J. L. Walsh - Level curves of Green's fns - Interesting contribution according to G. Szegö.

The sphere in Topology by R. L. Wilder : Amer. Math. Soc Semicent. Publ. 2, 136-84 (1938) Addresses delivered

---

T. Y. Thomas : New Theorems on Riemann - Einstein spaces Rec. Math. Moscow, N.S. 3, 331-39 (1938)

T. Y. Thomas :- Recent trends in Geometry : Semi-cent. Publ 2 98-135 (1938)

Math. Vereinigung 48 Bd 9-12 Heft : K. Strubecker on Geometry of isotropic spaces & applications

---

Books : L. M. Blumenthal - Theory Distance Geometries Columbia, 1938, Univ. of Missouri Kart, $ 1.25 -

8	1	6
3	5	7
4	9	2

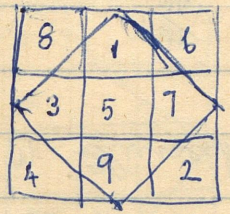


Fig (A)

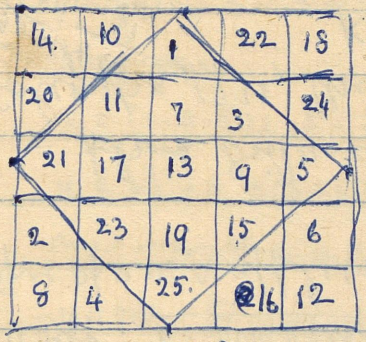


Fig. B.

Lozenges

(-3, 3) RM ‖ (-2, 2)
BM (0, -1). ‖

p. 42 of C.M (Carés magiques) where it is found that a 3rd order square is lozenge (Vide Andrews, pp. 214-247. Fig A above shows that a 3×3 is Lozenge. In Andrews, we find 3 methods. All these methods are, however, equivalent to the D.D.M with R.M (-3, 3) ~~for n = 7~~, B.M (0, -1) for $n = 7$, & R.M (-4, 4). B.M (0, -1) for $n = 9$, R.M (-2, 2). B.M (0, -1) for $n = 5$. So that in general R.M would be $(-m, m)$ & B.M $(0, -1)$ for $n = 2m+1$. ~~Otherwise~~ We also find that all these squares are associated. This is easily explained, since, in general, for an associated square

$$i = (1 - a - a')m, \quad j = (1 - b - b')m$$

Here $(a, b) = (-m, m)$ & $(a', b') = (m, -m+1)$

i.e. $i = (1 + m - m)m = m$, $j = (1 - m + m + 1)m = 2m$.

~~Where~~ i.e. $(i, j) = (m, 2m)$ is the middle of top row!

I wonder, if there be other lozenge squares with others R.M's & B.M's for odd n ~~for $n = 5$~~. (Mention lozenge square in main book under $n = 3$ & say it is noticed by Narayana Pandita).

T. G. Room – The Geometry of Determinantal Loci, 4835,
Cambridge 1938, Geb. 42/–

E. Sperner – Zur Begründung der Geom. in begrenzten Ebenenstücken
Max Niemeyer, Brosch, R.M. 2.40.

T. Takasu – Differgeom in d. Kugelräumen, Bd I
Marugen & Co, 7.40 R.M.

Acta Math. 70 (1–2).

Crelle. Bd 180 (Heft 1/2)

p. 121 – Nanaka Nevanlinna: on Schwarz's
alternierende Verfahren

Math. Zs. 44 Bd (11/1/39)

p. 689: E. Schmidt: Isoperimetric problems in
space of n-dimensions

---

p. 789: N. A. Shastri – on an α-integral
involving Bessel functions

$a+a' = 3$ $\quad S = \frac{1}{2}\cdot 7\cdot 58 = 175$

From Carrés magiques (Fig. 7, p. 40) - form the numbers ~~xy or $7x+y$~~ (x,y) forming $7x+y+1$, the square reduced to

1	16	31	46	12	27	42
32	47	13	28	36	2	17
~~44~~	~~32~~	~~37~~	~~53~~	~~23~~	33	48
38	4	19	34	49	8	23
20	35	43	9	24	39	5
44	10	25	40	6	21	29
26	41	7	15	30	45	11

Fig 7, p. 40 (in decimal notation)

R.M $= (-2,-1)$; $(a,b) = (-2,-1)$

D.M: $(3,3)$ $\quad (a',b') = (5,4)$

$ab' - a'b = -8+5 = -3$

$a \pm b = (-3,-1)$

$a' \pm b' = (9,1)$

} ok prime to n

Hence nasik. So this Tarry's business often under generalised D.M. Nothing really new except some new notations & indices

In fact $(i,j) = (0,6)$, but we can take (i,j) anywhere.

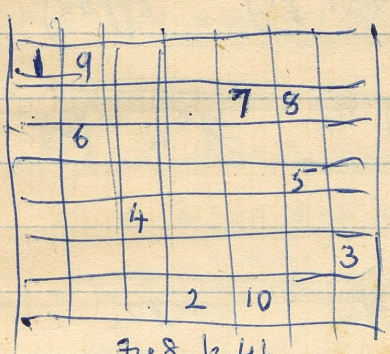


Fig 8, p. 41

R.M $= (3,1)$ $\quad (a,b) = (3,1)$

B.M $= (1,0)$ $\quad (a',b') = (-2,-1)$.

$ab' - a'b = -1$

$a \pm b = (4,2)$, $a' \pm b' = (-3,-1)$

So ~~n~~ prime to n.

1	7	13	19	25
~~18~~	24	5	6	12
10	11	17	23	4
22	3	9	15	16
14	20	21	2	8

Fig 9, p. 41.

R.M $= (-2,-1)$

B.M $= (1,0)$.

Interchange rows for normal square arrangement

1	7	13	19	25
14	20	21	2	8
22	3	9	15	16
10	11	17	23	4
18	24	5	6	12

Fig. 10, p. 41

R.M $= (-2,-1)$

B.M $= (1,0)$

This fig is same as fig 9 with rows interchanged suitably

Annals of math. Vol 40. No. 1 (Jan 1939):

p. 48. H. Hilton – on properties of rectilinear congruences

" 58 J. L. Synge: Remarks on above.

" 141. H. Weyl: Unitary metrics in proj. space

" 149. E. Wigner: Unitary repr^no of the inhomogeneous Lorentz-Group

(Here reference is made to a theory with real wave functions by P. A. M. Dirac (in print) & Ref. also to E. Majorana: Nuovo Cim, 14, 171, 1937.

Tech. Phys. U.S.S.R Vol 5, No. 10 (1938)

Vol 9 " No. 9: J. Frenkel p. 685 – Electrical breakdown of Dielectrics

---

Zs. f. Astr. 17 Bd 3/5 Heft

p. 170. E. A. Kreiken – General Aspect of Milky Way

p. 320. K. Walter: Apsidenbewegung in Double Star Systems

p. 344. C. Lonnqvist – A criticism of Corlin's work on accumulation of meteorites

---

Table Answers p. 16, Ex. 26 & table only. middle row & apply Nelson's scheme.

3	2	1	5	4
4	3	2	1	5
5	4	3	2	1
1	5	4	3	2
2	1	5	4	3

+

5	0	20	15	10
0	20	15	10	5
25	20	18	5	0
15	10	5	0	20
10	5	0	20	15

8	2	21	20	14
4	23	17	11	10
25	19	13	7	1
16	15	9	3	22
12	6	5	24	18

(2,2), ~~(2,2)~~ R.M is (2,2)

B M is ~~(-1,0)~~ (1, 0)

Regular!

accurate

Jim Nelson's method does not work

4	5	1	2	3
5	1	2	3	4
1	2	3	4	5
2	3	4	5	1
3	4	5	1	2

10 3	15 4	20 5	0 1	5 2
5 2	3^{10}	4^{15}	5^{20}	1
1^{0}	2^{5}	3^{10}	4^{15}	5^{20}
20 5	1^{0}	2^{5}	3^{10}	4^{15}
15 4	5 20	1^{0}	2^{5}	3^{10}

14	20	21	2	8
10	11	17	23	4
1	7	13	19	25
22	3	9	15	16
18	24	5	6	12

accurate

(-2, 2)

R M = ~~(2,2)~~

B M = (1, 0)

Carlo Sequence Book 17

Zs. f. Phys 111. Bd 7 & 8 Heft.

p. 498. P. Jordan*: Anmerkung zur Theorie der Elementarteilchen - It is shown that that Electrons & neutrinos can be taken as building materials for constructing heavier particles - Jordan gives a reference to my paper on the Neutrino-theory of light along with that of Pryce - the first sensible man to do this - in contrast to neglection by Sokolow of my paper

p. 537. E. Foradori - Das Raumbild der Physik Revision der math. Grundlagen der phy. Raumkontinuum appears to be a deep paper - Reference to A. March.

Zs. f. tech Phys. Nr. 2 (1939)

p. 56. Modelle zum Logarithmenpapier von A. Walther, H-J. Dreyer & H. Estenfeld, D. Darmstadt (aus dem Inst. f. Praktische Math. d. Tech. Hochschule Darmstadt

Exh

Phys. Rev: Vol 55. (15/1/39)

p. 170. Hyperfine structure of Cs by Elliott & Wulff (Reference to Sibaiya is given)

4	3	1	5	2
1	5	2	4	3
2	4	3	1	5
3	1	5	2	4
5	2	4	3	1

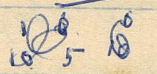
+

0	20	15	5	10
5	10	0	20	15
20	15	5	10	0
10	0	20	15	5
15	5	10	0	20

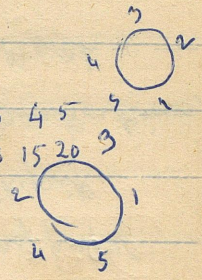
4	23	16	10	12
6	15	2	24	18
22	19	8	11	5
13	1	25	17	9
20	7	14	3	21

(1,2), (1,2), (2,-1), (-1,-2) | (1,1)
(1,2), (1,2), (2,-1), (-1,-2) | (0,-2)
(1,2), (1,2), (2,-1), (-1,-2), | (1,1)
(1,2), (1,2), (2,-1), (-1,-2), | (-1,0)
(1,2), (1,2), (2,-1), (-1,-2)

(n)



1 2 3 4 5
0 5 10 15 20



Nelson in Eng. Americana, (Note Bk. 14, p. 53)

3	2	4	5	1
1	3	2	4	5
5	1	3	2	4
4	5	1	3	2
2	4	5	1	3

(A)

+

2_5	4_{15}	5_{20}	1_0	3_{10}
4_{15}	5_{20}	1_0	3_{10}	2_5
5_{20}	1_0	3_{10}	2_5	4_{15}
1_0	3_{10}	2_5	4_{15}	5_{20}
3_{10}	2_5	4_{15}	5_{20}	1_0

(A')

=

8	17	24	5	11
16	23	2	14	10
25	1	13	7	19
4	15	6	18	22
12	9	20	21	3

(1,1), (2,2), (1,1), (-2,-2) | (-1,2)
(1,1), (2,2), (1,1), (-2,-2) | (0,1)
(1,1), (2,2), (1,1), (-2,-2) | (-1,2)
(1,1), (2,2), (1,1), (-2,-2) | (1,0)
(1,1), (2,2), (1,1), (-2,-2)

Very funny! 3 & 10 in centres, but still not associated unlike Andrews's squares

[See Bk. 13, p148 ff]

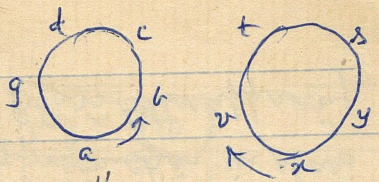
p. 190 : U. E. Lamb - Capture of Neutrons by atoms in a crystal
— on Bohr's theory of the compound nucleus

---

p. 229 - Letter on α-particle model of 4n - Nuclei
p. 233 - Abstracts contain head of papers on nuclear physics

Phys. Rev Vol 55. No. 1 (1/1/39)

p. 15. A. Hulme - Penumbra of Cosmic Radiation - Uses Bush's differential analyser to sift the data
p. 24. New evidence for Neutrinetto (or Neutretto) of Heitler by F. R. Shonka
p. 47. Radioactivity induced by nuclear excitation P Goldhaber & others
p. 52. Quadratic Zeemann effect (ie displacement $\propto \vec{H}^2$)
p. 70. Iteration method applied to oxygen nucleus by G. Horvay
p. 94. Field theory of elementary particles by N. Rosen (USSR) criticises Born-Infeld theory & gives an alternative
p. 103. Letter by Bethe on Energy production in stars
p. 105. Letter by Millikan quoting Bohr's letter approving



(1)	2	3	4	5
4	5	(1)	2	3
2	3	4	5	(1)
5	(1)	2	3	4
3	4	5	(1)	2

a+t, h+v, c+x, d+y, g+s

d+x, g+y, a+s, h+t, c+v

0	5	10	15	(20)
10	15	(20)	0	5
(20)	0	5	10	15
5	10	15	(20)	0
15	(20)	0	5	10

1	7	13	19	25
14	20	21	2	8
22	3	9	15	16
10	11	17	23	4
18	24	5	6	12

r.m = (-2,-1)
B.M = (1,0)
regular.
(n)

(3)	1	2	5	4
5	4	(3)	(1)	2
(1)	2	5	4	(3)
4	(3)	(1)	2	5
2	5	4	(3)	(1)

15	0	5	20	(10)
5	20	(0)	15	0
(10)		20		
		0	(10)	
	(10)	15		

	5	20	(10)	
	(10)			
(10)		20		
		0	(10)	
	(10)	15		

10	0	5	20	(15)
5	20	(15)	10	0
(15)	10	0	5	20
0	5	20	(15)	10
20	(15)	10	0	5

13	1	7	25	19
10	24	18	11	2
16	12	5	9	23
4	8	21	17	15
22	20	14	3	6

(-2,-1), (-1,2), (2,1), (2,1), (2,-2)
(-2,-1), (-1,2), (2,1), (2,1), (-2,0)
(-2,-1), (-1,2), (2,1), (2,1), (1,1)
(n) (-2,-1), (-1,2), (2,1), (2,1), (1,1)
(-2,-1), (-1,2), (2,1), (2,1)

the name "mesotron" (intermediate particle) suggested by Anderson & Neddermeyer & saying that at the Copenhagen Conference Auger, Blackett, Fermi, Heisenberg & Rossi all agreed to the name

---

J. de Phys t. 10, Jan. 39

p. 10. Becquerel et Handel introduce a new term "metamagnetism"

p. 23. L. Goldstein – Stat. mechanism of nuclear collisions

p. 32. J. Mariani – Macr. theory of fields

(A reference to Narlikar)

Ann. d. Phys

Ap. J Vol 89. No. 1. Jan 39

p. 26 – Solar corona photographs.

p. 84 – The 82" mirror of Mc Donald Observatory Texas

p. 116 – The Lane-Emden function $\theta_{3.25}$ by S. Chandrasekhar

BK || (refers to author's Intr. to study of stellar structure book in Press, Univ. of Chicago Press*

Enh || p. 136 – 137 – 7 beautiful photographs of nebulosities good for slide work.

Narayana Pandita's method as in Gauta Kaumudi for odd squares

10	5	0	20	15
15	10	5	0	20
20	15	10	5	0
0	20	15	10	5
5	0	20	15	10

+

4	5	1	2	3
5	1	2	3	4
1	2	3	4	5
2	3	4	5	1
3	4	5	1	2

=

14	10	1	22	18
20	11	7	3	24
21	17	13	9	5
2	23	19	15	6
8	14	25	16	12

3	2	1	5	4
4	3	2	1	5
5	4	3	2	1
1	5	4	3	2
2	1	5	4	3

5	4	2	3	1
1	5	4	2	3
3	1	5	4	2
2	3	1	5	4
4	2	3	1	5

+

0	10	5	15	20
10	5	15	20	0
5	15	20	0	10
15	20	0	10	5
20	0	10	5	15

1	3	2	4	5
3	2	4	5	1
2	4	5	1	3
4	5	1	3	2
5	1	3	2	4

+

0	10	5	15	20
10	5	15	20	0
5	15	20	0	10
15	20	0	10	5
20	0	10	5	15

=

1	13	7	19	25
13	7			

×

5	14	7	18	21
11	10	19	22	3
8	16	25	4	12
17	23	1	15	9
24	2	13	6	20

×

1	2	5	4	3
2	5	4	3	1
5	4	3	1	2
4	3	1	2	5
3	1	2	5	4

20	15	5	10	0
0	20	15	5	10
10	0	20	15	5
5	10	0	20	15
15	5	10	0	20

×

10	15	20	5	0
0	10	15	20	5
5	0	10	15	20
20	5	0	10	15
15	20	5	0	10

=

11	17	25	9	3
2	15	19	23	6
10	4	13	16	22
24	8	1	12	20
18	21	7	5	14

p. 142. BK || Review by Struve of Russel-Dugan-Stewart Vol II (2nd Edn)

Helv. Phys. Acta Vol 12, Fasc. Primus.

p. 3. Relativ. Th. Kraftfreier Teilchen by M. Fierz (reference to Yukawa, Kemmer, Proca, Jordan, Pauli etc)

p. 55. A. Mercier – Proper energy of the electron (Work done at Copenhagen. ref to Bohr).

Abh. Pruss. Akad. 1938. Nr. 8.

A. Brill: Stellarstatistik Methoden II

Comptes Rendus t. 208, No. 3 (16/1/39)

p. 162. B. Kwal. Relat. generalisations of the fund. eqns of analyt. mech

p. 167. G. Petiau: Electromag. eqns of photon theory.

ibid No. 5 (30/1/39)

p. 321. Topology of orth. group of n variables by C. Ehresmann (presented by E. Cartan)

---

p. 332. G. Beck: A theorem on structure of photon & neutron

Ref. Nature 141, 1938 p. 609

(Bush at Mass. Inst. Technology)

Bush

* Ref. J. Jason. Frank. Inst. 212, 447, 1931

Lemaitre & Vallarta: Phys. Rev. 50, 493, 1936

As a mechanical method of integrating diff. eqn. quadrant which are no longer integrable.

but with some regularity ie regularly irregular (?)

Take (α) on p. 131 of Ark. 13)

R.M	B.M
(2,−1), (1,−2), (0,2), (2,−1)	(2,−2), (0,2), (0,2), (2,−2).
(−1,−1), (−2,1), (2,1), (−2,1)	
(−2,−2), (−2,−1), (−2,−1), (−2,−2).	
(−2,1), (2,1), (−2,1), (−1,−1)	
(2,−1), (0,2), (1,−2), (2,−1),	

Same as for (β)

(−2,0), (−1,1), (0,−2), (−1,−2)	(−2,−1)
(2,0), (0,2), (−2,1), (1,−2).	(−2,1)
(0,−1), (1,1), (1,1), (0,−1)	(−2,1).
(1,−2), (−2,1), (0,2), (2,0)	(−2,2).
(−1,2), (0,1), (2,1), (2,0)	

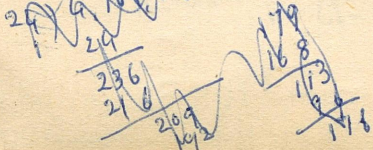
Both for (α) and (β), (i,j) = (2,0)

4,769,936

~~24) 4,769,936 (198~~ 74 8 × 596,242 = 16 × 298121

~~24~~
~~236~~
~~216~~
~~209~~
~~192~~

~~179~~
~~168~~
~~113~~
~~96~~
~~116~~



ibid. Nr. 6 (6/2/39): p. 414. Inequalities between the maxima of successive derivatives of a function by H. Cartan (presented by E. Cartan) – Related to K.S.K's work, but no reference to it – Refers to Groosy's work however

p. 432. J. Yvon: On radius of the electron – refers to recent work of Dirac & Pryce

---

Atti. R. Acad. Nas Vol. 28 – Fasc 9 (5/11/38) – No of articles on Diff. Geom by Italian School – on Deformation, Mindings method, Proj. Diff. Geom, quasi-asymptotic curve etc

---

J. Franklin. Inst. Jan 1939.

p. 1 – 37 – on Cosmic rays – Discussion

p. 6. A photograph of the famous Bush's Diff. Analyser.*

Akad. Wet: Vol 42, No 1. p. 54. Bruins – on Euler-Heisenberg new theory of decay of mesotrons

---

$x + 3y + 1$.

$(0,0) \to (3,0)$ | $(0,1) \to (1,0)$
$(1,0) \to (2,0)$ | (
$(2,0) \to (1,0)$
$(3,0) \to (0,0)$
$(4,0) \to (4,0)$

4	14	25	20	2
16	21	11	9	8
3	7	13	19	23
18	17	15	5	10
24	6	1	12	22

Got from Chinese Kosher skeleton [Bk. 13, p. 131 Fig (3)]

~~1 → 2 = (2, −1)~~ ie regular moves are (2, −1), (1, −2), (0, 2), (−2, 2).
(1 − 5)

break moves (−2, −1), (−2, 2), (−2, 2), (−2, −1).

(6 − 10) → (0, 2), (−2, 1), (−1, 0), (1, −2)
(11 − 15) → (1, 2), (−1, 2), (−1, 2), (1, 2)
(16 − 20) → (1, −2), (−1, 0), (−2, 1), (0, 2)

(21 − 25) → (−2, 2), (0, 2), (1, −2), (2, −1)

break moves are symmetrical ⟷ & regular moves from (1 to 5) & (21 to 25) are reverses of each other; similarly those from (6 to 10) & (16 to 20) while (11 to 15) is its own reverse. Thus here we have a square $n = 5$ which again unlike the case of $n = 9$ obtained in Fig ~~6~~ 61, p. 78 of main book (from Bell) where we have one common series of regular moves which is its own reverse & one series of break moves which is its own reverse. Here the series of break moves is its own reverse while the ~~series of break moves is not one~~ regular moves are not given by one series but by 5 series with 1st & 3rd, 2nd & 4th being reverses of each other while the 3rd series is its own reverse. So if we call the 9 x 9 square as semi-regular (ie instead of one common regular move & one common break move which is regular) we have one common series of regular series & a ~~single~~ series of break moves; we wonder what name we should give to this funny square ~~Regs~~ irregular (?

Naturwiss. J. 27, (20/1/39). p. 44. Review of Stark's "Forschung & Prüfung – 50 Jahre Phys-Tech-Reichsanstalt. by W. Gerlach, Munchen who says

"Diese genannten anderen Teile sind nicht frei von persönlichen Bemerkungen und subjektiven Ansichten, die zwar ~~phys~~ psychologisch interessant, aber nicht alle richtig sind. Zur Verwendung des Buches für eine Geschichte der Physik ist auf alle Fälle ein Quellenstudium zu empfehlen".

Sc. Papers of Inst. Phys & Chem. Research Vol 35, Dec 1938

p. 1. Z. Yosida – Lichtenberg's figures (electric discharge).

p. 8. Umeda – Debye temp of liquid drop model of nucleus – (Follows Bethe's report)

Proc. Nat. Acad. Vol 25, Jan 39, No. 1

p. 52: J. W. Alexandr – Concept of a topological space

---

constn of non-regular odd magic squares. ie where regular moves vary from step to step & also break moves. Is it possible to get such a scheme for the simplest case $n = 5$? What about (i, j)

regular moves : $(1,2), (-2,1), (-2,1), (1,2)$

break moves : $(0,-1), (1,0), (1,0), (0,-1)$.

9	19	4	14	24
13	23	8	12	3
15	2	12	22	7
25	10	11	5	15
1	0	21	6	14

~~7 ails in 4 rows, but right in cols & diags~~

13 − 22

$i = (1+3-4+3-7-3+7+3-7+3-7-3+7+3-7+3-4)4$

$= (10-15)4 = -20 \equiv$

$(-12+22)4 \equiv 40 \equiv 4$

6	9	17		12
12	14		3	8
15	2	7	11	
13	5	10	16	0
1	6	15		14

$(1,2), (2,1), (1,2), (1,2)$

$(0,-1), (1,0), (1,0), (0,-1)$ $\quad (13-22)4 = -36$

$i + (-3-3+3-3-3+3-3-3)x$ $\quad i - 12x + 22y$ $\quad i = 4 \equiv 8$

$+ (4+7-7+7+7-7+7+4)y$ $\quad i - 48 + 88 = 4 = -36$

impossible to have arbitrary (i, j) & arbitrary r & b-moves.

$a = -3$

$a + a' = 1$

$(-3,-2), (-3,1), (3,2), (-3,1), (-3,1), (3,2), (-3,1), (-3,-2)$

$(1,2), (4,2), (-4,-1), (4,2), (4,2), (-4,-1), (4,2), (1,2)$

$(4,4), (7,1), (-7,-3), (7,1), (7,1), (-7,-3), (7,1), (4,4)$

$\begin{pmatrix} -3 & 4 \\ -2 & 4 \end{pmatrix}, \begin{pmatrix} -3 & 7 \\ 1 & 1 \end{pmatrix}, \begin{pmatrix} 3 & -7 \\ 2 & -3 \end{pmatrix}, \begin{pmatrix} -3 & 7 \\ 1 & 1 \end{pmatrix}, \begin{pmatrix} -3 & 7 \\ 1 & 1 \end{pmatrix}, \begin{pmatrix} 3 & -7 \\ 2 & -3 \end{pmatrix}, \begin{pmatrix} -3 & 7 \\ 1 & 1 \end{pmatrix}, \begin{pmatrix} -3 & 4 \\ -2 & 4 \end{pmatrix}$

$j + (-2+1+2+1+1+2+1-2)x + (4+1-3+1+1-3+1+4)y$

$j + 4x + 6y = 4$

$j + 16 + 24 = 4$

$j = -36$

Trans. Roy. Soc. Canada: May 1938

p. 125. N. H. Walson – on Systems of Electrostatic fields

12/3/39 Nature (7/1/39):

p. 36. The differential analyser in Elec. Engineering (J. inst. Elec Engineers No. 503) – description by Hartree & Nuttall (Dr V. Bush mentioned).

---

p. 38. L. C. Young appointed for Sc. D at Cambridge

(21/1/39) Macmillan & C. Cosmology by J. M. Mc Williams (9s/ Bk || Prof. of Cosmology, St Louis Univ, U.S.A

p. 99. Physics of the 18th Century by Sir A. Fleming

---

p. 116. Letter by Gamow & Teller on Expanding Universe

(28/1/39). Advt: Universal mechanics Apparatus W. & J. George Ltd, Proprietors of F. E. Becker & Co, London

$n = 35$ only 9 D.M need be considered

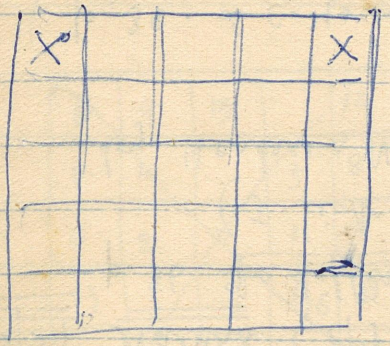
$\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$ u.d is $y = c$
l.d is $2x - 3y = d$. (35 cases)

for $(\pm 1, 0)$ etc same results as for $n = 25$.

Consider in more detail cases for $n = 9$ u-connection with pushing up & down, left or right business; ~~let us call it~~

~~m.p.~~ only $(2,0)$ & $(0,2)$ hold. Take $(0,-2)$ which does not hold. using fig 36(a)

p. 60 of main text book [See p.



$\begin{pmatrix} 1 & -2 \\ 1 & 0 \end{pmatrix}, \begin{pmatrix} 1 & 0 \\ 1 & 0 \end{pmatrix}, \begin{pmatrix} 1, & 0 \\ 1, & -2 \end{pmatrix}, \begin{pmatrix} 1, & -2 \\ 1, & -2 \end{pmatrix}$

$\begin{pmatrix} 1, & -2 \\ -1, & 2 \end{pmatrix}, \begin{pmatrix} -1 & 0 \\ 1 & 0 \end{pmatrix}, \begin{pmatrix} -1, & 0 \\ -1, & 2 \end{pmatrix}$

$a - b, \ a + b$.

$a = 1, 2, 4$. $(1,1), (1,2), (1,4)$
$b = 1, 2, 4$. $(2,1), (2,2), (2,4)$
$(4,1), (4,2), (4,4)$.

$(a-b, a, a+b)$ $(2, 3, 4)$, $(-2, 0, 2)$

3-1. 332. $a = 3, b = 1$
$a = 0, b = 2$

$2x - 2y$ $x - y = c$
$2x + y = d$

$x = c$. $c = x - 2$.
$-2, -1, 0, 1, 2$, $3, 4, 0, 1, 2$

$(0,2), (1,2), (2,2), (3,2), (4,2)$

11, 12, 13, 14, 15

$2x + 2 = 0, 1, 2, 3, 4$

$2x = -2, -1, 0, 1, 2$
$x = -1, 2, 0, 3, 1 =$

p. 135 : Review of Smart's book by H. S. J (Rather critical)
p. 140. " C. N. Moore's book by A. v. Z. (?)

BK : The genetics of garden plants by M. B. Crane & W. J. C. Lawrence (Macmillan & Co, $12^s 6^d$ net)
(for Plant breeder & Sc. gardener)

(Coxeter's book also available at Oxford. Univ. Press $4^s 6^d$)

BK || F. D. Murnaghan : The Theory of group representations (John Hopkins, London, Oxford Univ. Press 1938 $22^s 6^d$ net)

BK || Actualité series No. 635 – J. Pacotte – L'Espace hermitien quantique

---

BK || Oxford Int. monographs. New volume by R. C. Tolman on principles of st. mech 40 s (!)

---

p. 155 : Mathematical films : Reference to note in Nature of
Enh ||

Take variations of I.D.M (I.M & W.M) with B.M's = $(\pm 2, 0)$, $(0, \pm 2)$.

$(n=9)$ I.D.M. $\begin{pmatrix} 1, & 1 \\ 1, & -1 \end{pmatrix}$, $\begin{pmatrix} 1, & -3 \\ 1, & -1 \end{pmatrix}$ ✗, $\begin{pmatrix} 1 & -1 \\ 1, & 1 \end{pmatrix}$, $\begin{pmatrix} 1, & -1 \\ 1, & -3 \end{pmatrix}$ ✗ cut out cases where a' or $b' = -3$

$\begin{pmatrix} 1 & 1 \\ 1, & -1 \end{pmatrix}$ u.d is $y = c$, l.d is $x = d$ } only one case, $\begin{pmatrix} 1 & -1 \\ 1, & 1 \end{pmatrix}$ u.d is $y = c$, l.d is $x = d$ } only one case

$(i,j) = (5, 4)$ $x = 4 = y$ $(i,j) = (4, 5)$. $x = y = 4$.

I.M $\begin{pmatrix} 1, & 1 \\ -1, & 1 \end{pmatrix}$, $\begin{pmatrix} 1, & -3 \\ -1, & 1 \end{pmatrix}$ ✗, $\begin{pmatrix} 1 & -1 \\ -1 & 3 \end{pmatrix}$ ✗, $\begin{pmatrix} 1, & -1 \\ -1, & -1 \end{pmatrix}$

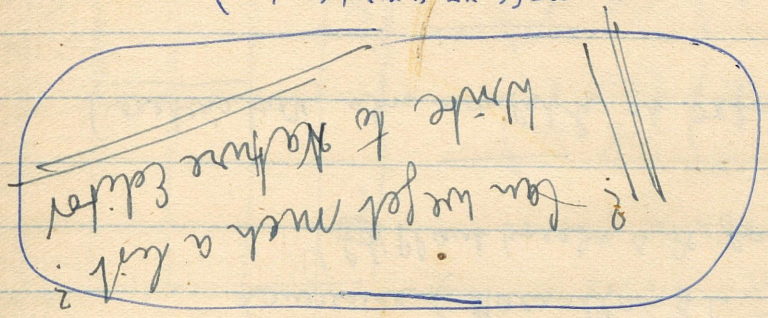
u.d $x = c$, l.d $y = d$ } $(i,j) = (5, 4)$ u.d is $x = c$, l.d is $y = d$ } $(i,j) = (4, 3)$.

W.M $\equiv$ I.D.M.

So in this case all three cases are equivalent for $n = 9, 15, 21, \ldots$ ie $3k$.

$n = 25$ I.D.M $\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$, u.d is $y = c$, l.d is $2x - 3y = d$

Can we get such a list?
Write to Nature Editor



$2x - 3y = d$ gives $d = 0, 1, \ldots 24$ (25 cases).

I.M & W.M same for all odd composites.

Variations with $(\pm 2, 0)$ & $(0, \pm 2)$: we have now to consider also cases discarded for $n = 3k$.

For the cases not discarded only one soln for I.M, I.D.M & W.M.

$\begin{pmatrix} 1, & -3 \\ 1, & -1 \end{pmatrix}$ u.d is $y = c$, l.d is $2x - 4y = d$ $\longrightarrow$ 25 cases. Same for $\begin{pmatrix} 1 & -1 \\ 1 & -3 \end{pmatrix}$.

Imp 25 cases for I.M also //

31/12/38, Stefan Bergmann points out how films might be made to illustrate the theory of fns of two complex variable. For details see Bergmann: (J. d. Math. Verein, 42, 238; 1932-33) but as far as we are aware no such films appear in current lists of those available for sale or hire

---

p. 158: Jean's reply to letter of Gamow & Teller

(4/2/39): p. 177. Ref to Max Born as a distinguished refugee man of Science

---

p. 180. Practice of plant propogation by Prof M. G. Kains & L. M. McQuesten (New York, Orange Judd Publishing Co, Inc, 1938 $3.50

BK (Set this)

Review by M. A. H. Tincker: The authors mention formalin as control for damping off, but the widespread use of in Gt. Britain of Chestnut mixture (prepared from copper sulphate & ammonium carbonate) is not an Amer. practice. The proved value of addl phosphates mixed in the compost after soil sterilisation has not been mentioned.

I.D.M, I.M & W.M for all composite n's

(1) I.D.M $\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$, $n=9$

u.d is $y = c \rightarrow c = 4,\ y = 4$.

l.d is $2x - 3y = d$, $\cancel{36 = 9d,\ d = 4,\ d = 0, 1, 2, 3, 4, 5, 6, 7, 8}$

$-36 = 9d,\ d = -4 \pmod 3$

$2, 5, 8, 11, 14, 17, 20, 23, 26$
$\equiv 2, 5, 8, 2, 5, 8, 2, 5, 8$

$c = 4$
$d = 2, 5, 8$

$2x - 3y = 2, 5, 8$, $\cancel{8 - 3y = 2, 5, 8,\ 3y = 6, 3, 0,\ y = 2, 1, 0}$. $2x = 17 = 8$

$2x = 12 + (2, 5, 8) = 14, 17, 20$

$(7, 4), (4, 4), (1, 4)$ $\qquad x = 7, 4, 1$

44, 41, 38 The three lower diagonals which are magic series contains these elements & these intersect the only upper diagonal which is a magic series viz (37, 38, 39, 40, 41, 42, 43, 44, 45) ie (0,4), (1,4), (8,4) ie $x = 4$ in these three points (See Fig. Bk. 17, p. 19, Bottom).

(ii) I.M $\begin{pmatrix} 1, & -1 \\ -1, & -1 \end{pmatrix}$ u.d $2x = c$, l.d is $-2y = d$ } only soln (4,4).

$i + x - y = 4$
$j - x - y = 4$ $\quad (i, j) \equiv (4, 12) = (4, 3)$. usual I.M. place.

(iii) W.M $\begin{pmatrix} 1 & -1 \\ 1, & 1 \end{pmatrix}$ u.d is $-2y = c$, l.d $2x = d$ } same as for W.M, $(i, j) = (4, 5)$ usual W.M. place

$n = 15$ For I.M & W.M we get only one soln which is associated.

For I.D.M, $y = c = 4$

$2x - 3y = d$. $\quad -105 = 15d,\ d = -7 \equiv 8$

$\frac{14 \cdot 15}{2}$

$8 \pmod 3 \equiv 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 43$
$\equiv (2, 5, 8, 11, 14), (2, 5, 8, 11, 14), (2, 5, 8, 11, 14)$

$d = (2, 5, 8, 11, 14)$. ie 5 posns instead of 3 in case of $n = 9$

p. 200. Letter by Bethe re. Fermi & Konopinski & Uhlenbeck theories of β-disintegration, suggesting the original Fermi theory to be correct

---

p. 201. Letter by F. J. Belinfante on the "a new form of the Baryteron Eqn & some related questions" – introduces queer terms like "undors!" (ie four-spinors) and "neutrinors" (ie undors equal to their own "charge-conjugate") – refers to papers of Kemmer, etc, etc.

---

p. 210: Short report of a discussion on Expanding Universe

BK. The Social Fn of Science by J. D. Bernal, Kegan Paul 12s 6d

---

(11/2/39). p. 220. Review by Yule of Pearson's book on Pearson

---

p. 233: A new type of nuclear reaction (announcement by Cable by R. D. Fowler & R. W. Dodson of Johns Hopkins confirming conclusions of Hahn, Lise Meitner & Strassman on bombardment of Uranium by neutrons – disintegration of Uran. nitrate

$n = 21$ with $\begin{pmatrix} 1, & 2 \\ 4, & -5 \end{pmatrix}$; $i = (1-1-2)10$, $j = (1-4+5)10$, $(i,j) = (-20, 20) \equiv (1, 20)$.

$-3x + 7y = 19$

$5x - 3y = 2, 5, 8, 11, 14, 17, 20.$

$(x,y) = (10,10)$

$\frac{442}{2}$

126

Taking $d = 17$, $-3x + 7y = 19$ $\quad -15x + 35y = 95$

$5x + 3y = 17$ $\quad 15x + 9y = 51$

$44y = 146$ $\quad 11y = 32.$

$22y = 73.$

$110 - 32 = 78$

221 $\quad 95$

$i + x + 2y = 10$ $\quad x + 2y = 9$

$j + 4x - 5y = 10$ $\quad 4x - 5y = -10$

$4x + 8y = 36$ $\quad 13y = 26, y = 2,$

$46 + 84 = 130$ $\quad 130 \equiv 25$

$13y = 46 \equiv 130 + 84 = 130$, $y = 10$, $x = 9 - 20 = -11 = 10$

$n = 25$ with $\begin{pmatrix} -1, & 1 \\ 2, & -1 \end{pmatrix}$ $\quad x = 12$

$-3x + 2y = 13$, $2y = 49 \equiv 24$, $y = 12$.

$i - x + y = 12$ $\quad (i,j) = (12, 0)$ $\quad i = (1+1-1)12 = 12$

$j + 2x - y = 12$ $\quad j = (1-2+1)12 = 0$

$n = 33$ with $\begin{pmatrix} 1, & 2 \\ 4, & -5 \end{pmatrix}$ $\quad -3x + 7y = c$ $\quad c = 31$ $\quad -3x + 7y = 31$

$5x - 3y = d$ $\quad d = 32$ $\quad 5x - 3y = 32$

$33 - 28 = 8$ $\quad -15x + 35y = 155$

$15x - 9y = 96$ $\quad 28y = 251 \equiv 284 \equiv 350$

$317 \quad 350 \quad 416 \quad 482 \quad 528$

$33 \quad 383 \quad 33 \quad 525 \quad 548$

$449 \quad 33$

$2y = 26$ $\quad 28y \equiv 528$

$y = 9$ $\quad 26y = 261.$

$= 261 + 165$

$528 - 251 = 277$ $\quad 148$ $\quad 8$ $\quad 308 - 251 = 57$ $\quad 448 - 251 = 197$

12

$416 - 251 = 165$ $\quad = 416$ $\quad y = 16$, $x = 16$ $\quad 5x = 32 + 48 = 80$

$i + x - 2y = 16$, $i = 32$

$j + 4x - 5y = 16$ $\quad j = 32$ $\quad (i,j) = (32, 32).$

$n = 35$ with $x = c = 17$ $\quad 2y = 18 + 51 = 69 \equiv 34$, $y = 17$, $x = 17$.

$-3x + 2y = d = 18$

$\begin{pmatrix} -1, & 1 \\ 2, & -1 \end{pmatrix}$. $\quad i - x + y = 17$ $\quad (i,j) = (17, 0)$

$j + 2x - y = 17$

on bombardment by deuterium neutrons. About 35 particles per minute causing very intense ionisation are produced.

p. 239. Letter on above by Meitner & Frisch – very interesting and non-mathematical (fission & resonance theory to prove of a barium isotope – understandable on Bohr's theory)

p. 241 – Letter by Møller & Rosenfeld on "Meson and nuclear forces" – highly complicated

p. 251. Report of work of Meitner, Hahn & Strassmann on Uranium bombardment & production of trans-Uran. elements

(18/2/39): p. 268. Natural Philosophy & Human Cultures – Address by Prof Niels Bohr to the 3rd Congress of Anthropological & Ethnological Sciences at Copenhagen August, 1938. – A wonderful address with a slight humorous bit at the end

BK || General Astronomy by H.S Jones 2nd Edn (Arnold) 12/6

$(7,6) = 98$ $(7,7) = 113$ ecc. la cifra media è associata

$(i,j) = (12,4)$ [K, b. 165]

(XI) $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ per $n = 9$, $x = 4$, $-3x + 2y = \dots$, $x = 4, y = 4$.

$\begin{pmatrix} 1 & 2 \\ 4 & -5 \end{pmatrix}$ $-3x + 7y = c$ $c = 1, 4, 7$ / $5x - 3y = d$ $d = 2, 5, 8$ / $-3x + 7y = 1$ — risolvi per x e y → $(i,1)$ $(1,4)$ $(1,7)$ / $(4,1)$ $(4,4)$ $(4,7)$ / $(7,1)$ $(7,4)$ $(7,7)$ — Sep. 141.

$(x,y) = (4,4)$ fuori arrotondamento

Ecc! $\begin{pmatrix} -1 & 3 \\ -2 & 4 \end{pmatrix}$ per $n = 35$. $i - x + 3y = 17$, $j - 2x + 4y = 17$. $(x,y) = (17,17) \to (i,j) = (51,51) = (\dots)$

$i = (1+1-3)17$, $j = (1+2-4)17$ $\to (i,j) = (-17,-17) = (18,18)$.

17
122 5
613
8
59 8
17
1
613

manca

Valore adatto a uscire a ricollocare
e decidere in addietro in indietro

* esercizio da fare in classe
Nome assegnato da Antonella Nobrega

$n = 25$. $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ $x = c = 12$

$-3x + 2y = d$, $-3x + 2y = 0$, -24.

$2y = 36 + d$ $d = 13$, $y = 12$. $(x,y) = (12,12)$.

$\frac{625+1}{2} = \frac{626}{2} = 313$

3 12
313
$2y = 49 = 24$

$d = -12$
$= 13$

$i = (1+1-1)12$, $j = (1+2-1)12$ $(i,j) = (12,0)$.

$n = 35$ $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ $c = 17$, d all values

$2y = 51 + d$ $d = -17 = 18$

$2y = 69$
$\equiv 34\,4 = 12$

$(17,7)$ $i = (17,0)$.

p. 276. Letter by Frisch on division of heavy nuclei by Neutron bombardment (Confirmation of Meitner, Hahn & Strassmann's work who suggested actual fission of uranium nucleus something like a liquid drop breaking into two (ie Ba-nuclei (Z = 56) produced from Uranium (Z = 92).

p. 276: Letter by Bhabha on Fundamental length introduced by the theory of the Mesotron (Meson)* — Combines work on heavy electron & Dirac's work on point electron - highly complicated

p. 298: award of James Scott Prize of R.S. Edin to Dirac his address on "Relation between Math & Phys"

p. 302. Report of Int. Inst. of Intellec. Coop. study meeting on principles & methods of math. Sciences

p. 303: Lond. Math. Soc discussion on molecular structure(!)

What about knight paths (both R.M & B.M) for the higher composites like

$n = 21, 25, 27, 33, 35$, etc.

Scheme on p. 127

$\begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$

	1, 2	−1, 2	1, −2	−1, −2
(2, 1)	$\begin{pmatrix} 2, -1 \\ 1, 1 \end{pmatrix}$	$\begin{pmatrix} 2, -3 \\ 1, 1 \end{pmatrix}$	$\begin{pmatrix} 2, -1 \\ 1, -3 \end{pmatrix}$	$\begin{pmatrix} 2, -3 \\ 1, -3 \end{pmatrix}$
−2, 1	$\begin{pmatrix} -2, 3 \\ 1, 1 \end{pmatrix}$	$\begin{pmatrix} -2, 1 \\ 1, 1 \end{pmatrix}$	$\begin{pmatrix} -2, 3 \\ 1, -3 \end{pmatrix}$	$\begin{pmatrix} -2, 1 \\ 1, -3 \end{pmatrix}$
2, −1	$\begin{pmatrix} 2, -1 \\ -1, 3 \end{pmatrix}$	$\begin{pmatrix} 2, -3 \\ -1, 3 \end{pmatrix}$	$\begin{pmatrix} 2, -1 \\ -1, -1 \end{pmatrix}$	$\begin{pmatrix} 2, -3 \\ -1, -1 \end{pmatrix}$
−2, −1	$\begin{pmatrix} -2, 3 \\ -1, 3 \end{pmatrix}$	$\begin{pmatrix} -2, 1 \\ -1, 3 \end{pmatrix}$	$\begin{pmatrix} -2, 3 \\ -1, -1 \end{pmatrix}$	$\begin{pmatrix} -2, 1 \\ -1, -1 \end{pmatrix}$

no cases for $n = 21, 27, 33, 39, \ldots$

$n = 25$. cases possible are

$\begin{pmatrix} 2, -1 \\ 1, 1 \end{pmatrix}, \begin{pmatrix} 2, -3 \\ 1, -3 \end{pmatrix}$

$\begin{pmatrix} -2, 1 \\ 1, 1 \end{pmatrix}, \begin{pmatrix} -2, 3 \\ 1, -3 \end{pmatrix}$

$\begin{pmatrix} 2, -3 \\ -1, 3 \end{pmatrix}, \begin{pmatrix} 2, -1 \\ -1, -1 \end{pmatrix}$

$\begin{pmatrix} -2, 3 \\ -1, 3 \end{pmatrix}, \begin{pmatrix} -2, 1 \\ -1, -1 \end{pmatrix}$.

& their reverses of R.M. & B.M.

(1) $\begin{pmatrix} 2, -1 \\ 1, 1 \end{pmatrix}$ & $\begin{pmatrix} 1, 1 \\ 2, -1 \end{pmatrix}$

u.d	$x - 2y = c$	$-x + 2y = c$
l.d	$3x = d$	$3x = d$

$5c = -300$, $c = -12 \equiv 13$ ie all values of c, $d = 36$.

(2) $\begin{pmatrix} 2, -3 \\ 1, -3 \end{pmatrix}$ u.d is $x = c$ $\quad c = 12$

l.d is $3x - 6y = d$ ~~, d = 0, 24~~ $\quad x - 2y = d \quad 25d = -300$, $d = -12 \equiv (13)$

$-900 = 25d$, $d = -24 \pmod 3$ $\equiv 1 \pmod 3 \pmod{25}$

~~4, 7, 10, 13, 20, 23 | 26, 29, 32, 35, 38, 41~~ (4, 7, 10, 13, 16, 19, 22) 25, ~~26, 29, 32~~, 28, 31, 34, ..

1, 4 $\quad$ 0, 3, 6, 9, 12, ..

nothing exciting //

Note: The values for c & d obtained before taking (mod 3) etc immediately give associated squares in all cases.

5x(i) $\begin{pmatrix} 2 & 8 \\ 7 & 2 \end{pmatrix}$ for $n = 15$, $c = 7$, $d = 13$ $\quad \left.\begin{matrix} -5x + 6y = 7 \\ 9x + 10y = 13 \end{matrix}\right\}$ $\quad \begin{matrix} -25x + 30y = 35 \\ 27x + 30y = 39 \end{matrix}$

~~52x = 16~~ $52x = 4$.

$i = (1 + 5 - 6)7 = 0 \quad (1 - 2 - 8)7$

$j = (1 + 9 - 10)13 = 90 \quad (1 - 7 - 2)7$

$i = -63$, $j = -56$. $\quad 6x = -3$, $6y = 7 + 35 = 42$, $y = 7$

$52x = -6 + 156 \equiv 9 \pmod{15}$

52, 104, 156.

$6y = 42$

$13x = 1$. $\quad$ 52, 104, 156, 208, 260.

312, 364 $\quad x = 7$:

$x = 7$, $y = 7$ // $(i, j) = (12, 4)$

Science (6/1/39). p. 19. Advt of pendulum wave machine - Central Sc. Co. (CenCo), Chicago, $70.00

Exh

p. 4. Report of Geol-globe of 5 ft 11" diam, shown electrically rotated at one revolu in 2½ min. Shown at Lond. Geo. Museum

idea for Exh

(13/1/39) p. 19: Mathematicians & poetry & drama by R.C. Archibald's address — most interesting

p. 30 – Dr Vannevar Bush as President of Muss. Inst which handles 1½ million dollars – Dr Bush acquainted himself with the work for six months before accepting – mention of a "Cinema integraph" as made by Dr Bush

(20/1/39) p. 46 – Archibald's address concluded

p. 59. Review of Ferrar's book by Walsh

(27/1/39) p. 76. Mention of award of 100,000 francs Monaco Prize to A. Denjoy

* Also at Columbia & John Hopkins

* Chess consisting of Roberts, Meyer, Heyerdingk, Halfstad, Turve & G. Breit

0
$-5 = 4$
9
0

$2x-3y$
$\parallel$
0

(0, 0) (2, 4)
(2, 3) (4, 7)
(4, 6) (6, 1)
(6, 0) (8, 4)
(8, 3) (1, 7)
(1, 6) (3, 1)
(3, 0) (5, 4)
(5, 3) (7, 7)
(7, 6) (0, 1)

$4-12 = -8$
$8-21 = -13$
$12-3 = -9$

i.d is $x = c$

u.d is $-3x + 2y = d$.

$-36 = 9d$ $\quad d = -4$

2, 5, 8.

New York City: Grand Central Terminal

3, 3, 6, 9, 12, 15, 18, 21, 24
0, 3, 6, 0, 3, 6, 0, 3, 6

* Where to get these?

Write to editor of Science

J. McKeen Cattell, Editor

The Science Press

$\sum x + n\sum y + n = S$.

$\frac{n(n-1)}{2} + \frac{n^2(n-1)}{2} + n$

$\frac{n}{2}\{(n-1) + n(n-1) + 2\}$

$\frac{n}{2}(n^2+1)$

(4, 0)
(1, 1)
(4, 2)
(4, 3)

Collect the schemes used by Kraitchik

(1) $\begin{pmatrix} 2 & 8 \\ 7 & 2 \end{pmatrix}$ for $n = 15$, (2) $\begin{pmatrix} -1, & 1 \\ 2, & -1 \end{pmatrix}$, (3) $\begin{pmatrix} 1, & 2 \\ 4, & -5 \end{pmatrix}$ for $n = 9$

for $n = 9$

(4) $\begin{pmatrix} -1, & 3 \\ -2, & 4 \end{pmatrix}$ for $n = 35$, (5)

We have heaps & heaps of other schemes specially with Knight's moves.

(3/2/39): p. 34. advt. Stereoscopes Descriptive Circular No. 2a

Exh || Sent on request by
Harrison C. Ryker Inc
1924 Franklin St., Oakland, Calif

---

p. 95: Report of the annual Science Exhibition –
States "In a room adjacent to the Exhibition
Exh || scientific motion pictures were almost continually
exhibited"* (A big number)

(10/2/39): p. 113. W. D. Cairns address on Seismology

---

p. 124. mentions publication of Raman Jubilee Volume

---

p. 135 (5): Report of bombardment of Uranium by
neutrons
"Ironically Dr. Meitner is an intellectual refugee
from Germany temporarily working at Stockholm"
– A dramatic report of a midnight experiment
performed ~~by John Hopkins~~ at Carnegie Inst.* before Bohr & Fermi
(on Sat. Jan 28th).

So the overall picture is that the Σ method which is more reasonable & simple works in all cases. For an eqn

$\frac{(n-1)n}{2}$ ~~$ax+by=c$~~ $\alpha x + \beta y = c$, $\underline{n}$:

$\frac{n(n-1)}{2}$ = $\alpha \cdot \frac{n(n-1)}{2} + \beta \frac{n(n-1)}{2} \equiv nc$.

$(n-1)\alpha + (n-1)\beta \equiv 2c$..

[Trial judgment!]

we have to take moduli for coeffs of the eqn + for the $\subseteq$ obtained

---

For eg. we had the Fidelista cases of $n = 25$ & $n = 35$ (p. 147)

$n = 25$ we have settled previously.

$n = 35$ $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ l.d is $x = c$, $c = 17$.

u.d is $-3x + 2y = d$.

$\frac{34 \cdot 35}{2} = 595$ $\quad \therefore -595 \equiv 35 \cdot d \quad d = -17$

$-17 \pmod 3 \equiv 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34$

$-2, -5, -8, -11, -14, -17, \ldots$

$\rightarrow d$ = all values from 0 to 34 / just like $n = 25$

$-17 \pmod 2 \rightarrow d =$ " "

Tantamount: Reveals weak-links monotonicity for parabolic-chain on Reynolds or Leap-Bayes *

$n = 35$, $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$ u.d is $y = c$

l.d is $2x - 3y = d$. same argument as above //

~~for $n=35$~~, $\begin{pmatrix} -1 & 3 \\ -2 & 4 \end{pmatrix}$ (K. p. 163) u.d is $x - y = c$, $2x - 3y \equiv$ multiples $\subseteq$ of $c = 0, \ldots -34$.

l.d, $-3x + 7y = d$

$4 \cdot 595 = 35d$, $d = 68 \equiv 33$. ~~$33 \equiv 2 \pmod 3$~~

No need

Remark

$33 \pmod 3 \equiv 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33$

$-3, -6, -9, -12, -15, -18, \ldots -33, -36, -39, -42, -45$.

@3 32, 29, ... 2, 31, 28

(Feb, 39)

Sc. American: 24 West 40th St. New York City – Write

Exh || enquiring about films for exhibition

Fortuny's, 67. W. 44th St, N.Y.C *

BK || There is fun in Geometry by Louis Kasper, $1.50

Exh

The Geometry of Algebra – Bifoliate Geometry

BK || by Robert A. Philip –

The Monographic Press

106. Washington St, Fairhaven, Mass.

Sundials by R. Newton & Margaret L. Mayall

BK || obtainable from Scientific American ($ 2.10)

Mem. d. Sc. Physiques. Fas. 38

Electr. properties of systems of Spheres by

BK || M. A. Guillet & M. M. Aubert (Images, Inversion etc)

The Educational Screen – This Journal

Exh || referred to in the J. Motion Pict. Engineers

for Feb 39 may be useful for educational films.

$\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$

21	22	23	24	25
16	17	18	19	20
11	12	13	14	15
6	7	8	9	10
1	2	3	4	5

7	14	16	23	5
13	20	22	4	6
19	21	3	10	12
25	2	9	11	18
1	8	15	17	24

4. d is $y = c$

1. d is $2x - 3y = d$.

$\therefore 5d = -10 \pmod 5 = 0$

~~$d = 1, 2, 3, 4$~~, $d = 0 \pmod 5$

$d = -2 \pmod 3$ ~~1, 2, 3, 4, 5~~

$d \equiv 3 \pmod 3$

$-3y + 4 = d$

$d = 4, 1, -2, -5, -8$

$= 4, 1, 3, 0, 2$

$(1,1), (4,3), (2,0), (0,2), (3,4)$.

$2x - 3y = -1, -1, 4, -6, -6 \equiv 4$.

$d \equiv -2 \pmod 3$.

~~1, 2, 3, 4~~

0, 1, 2, 3, 4

$-6 + 2x = d$

$d = -6, -4, -2, 0, 2$

$= 4, 1, 3, 0, 2$

$2 \cdot 1 - 3 \cdot 1 = -1$	$-10 \equiv 20 \pmod 5$ ✓
$2 \cdot 4 - 3 \cdot 3 = -1$	
$2 \cdot 2 - 3 \cdot 0 = 4$	$5d \equiv -10$, $d = 0, 1, 2, 3, 4$ //
$2 \cdot 0 - 3 \cdot 2 = -6$	
$2 \cdot 3 - 3 \cdot 4 = -6$	$25d \equiv -300$. $d = 0, 1, 2, \ldots -24$ //

$d = -2 \pmod 3$

$\equiv 1, 4, -2, -5, -8$

$= 1, 4, 3, 0, 2$ //

$d \equiv 13 \pmod 3$

n = 9. $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ $-3x + 2y = d$.

$9d = -36$.

~~$9 = -36$~~. $d = -4$.

0, 1, 3, 4, 7, 9 ✗

$-4 \equiv 1 \pmod 3$ ✗

2

$d = -2 \pmod 3$

$d = 1, 4, 7 \ldots$

$-3x + 8 = d$

$d = 8, 5, 2, -1, -4, -7, -10, -13, -16$

$\equiv 8, 5, 2, 8, 5, 2, 8, 5, 2$

$d \equiv 3 \pmod 2$

$= 1, 3, 5, -1, -3 \equiv 1, 3, 5, 4, 2$ ✓

$-3x + 2y = d$ $d = +3 \pmod 3$ all 25 ✓

$d = 13 \pmod 2$ $d = 1, 3, 5, 7, 9, 11, 13, -1, -3, -5, -7, -9, -11, -13, -15, -17, -19, -21, -23$

$-25, -27, -29, -31, -33, -35$.

$= 1, 3, 5, 7, 9, 11, 13, 24, 22, 20, 18, 16, 14, 12, 10, 8, 6, 4, 2, 0, 23, 21, 19, 17, 15$

all 25 ✓

Observatory : Feb 39, p. 53

A new suspected white dwarf : report by A. N. Deutsch — so far as are known.

Report in I. A. U. Circulars Nos. 737 & 738 of

(1) a supernova in N. G. C. 4636 by Zwicky

(2) a nova or variable near Betelgeuse by Wachmann

Should (2) be confirmed it would be of particular interest because of its faintness & position away from galactic centre.

Bull. Amer. math. Soc Vol 44, No. 12, 741, Dec 38 - A number of interesting addresses by G. Birkhoff, Ore, M. H. Stone, Baer, Menger & MacNeille

Read

Stone remarks — "A cardinal principle of modern mathematical research may be stated as a maxim "one must always topologize""

Math. Gazette : Feb 39

Elementary matrices by Frazer, Duncan & Collar

BK

C. V. P (30s)

$\frac{14 \cdot 15}{2} = 105$

$n = 15$ with $\begin{pmatrix} -1, & 1 \\ 2, & -1 \end{pmatrix}$ $\quad c = 7.$ $\quad -3x + 2y = d$

By Σ method, $15d = -105 = -7$ $\quad -7 \pmod 3 = 2, 5, 8, 11, 14.$

$-3x + 14 = d$, $d = 14, 11, 8, 5, 2, -1, -4, -7, -10, -13, -16, -19, -22, -25, -28$

$= (14, 11, 8, 5, 2), (14, 11, \ldots 2), (14, 11, 8, 5, 2)$ //

$y = 3$ in my method instead of $y = 7$,

$-3x + 6 = d$, $d = 6, 3, 0, -3$, does not work

$y = 4$, $-3x + 8 = d$, $d = (8, 5, 2, -1, -4)(-7, -10, -13, -16, -19), (-22, -25, -28, -31, -34)$

$= (8, 5, 2, 14, 11), (8, 5, 2, 14, 11), (8, 5, 2, 2, 14, 11).$

$y = 2$, $-3x + 4 = d$, $d = 4$, — ✗

$y = 1$, $-3x + 2 = d$, $d = 2, -1$, ✓

$y = 10$, $-3x + 20 = d$, $d = 20, 17$, ✓

$y = 13$, $-3x + 26 = d$, $d = 26$, ✓

~~$y = 16$, $-3x + 32 = d$, $d = 32$~~ ✓

$y = 1, 4, 7, 10, 13$, all work, $y = 0, 2, 3, 5, 6, 8, 9, 11, 12, 14$ don't work //.

$n = 25$, $d = -12 \equiv 13 \pmod 3 \rightarrow 1, 4, 7, 10, 13, -2, -5, -8, -11, -14, -17, -20, -23, -26, -29,$

$-32, -35, -38, -41, -44, -47, -50, -53, -56, -59$

$= 1, 4, 7, 10, 13, 23, 20, 17, 14, 11, 8, 5, 2, 24, 21, 18, 15, 12, 9, 6, 3, 0, 22, 19, 16$ //

$=$ all the 25 mos.

no need to take (mod 3)

since 3 is not a factor of 25.

P.T.O

p. 97 – Very favourable review of Lassenhaus by P. Hall.

Exh || 105 – 59. Icosahedra – Review by J. C. P. Miller – Mentions that models of all the icosahedra have been made by H. T. Flather (Toronto. 4s 6d.) – Write to A. R. G to find out if these models can be had.

p. 113 A musical slide rule by LL. S. Lloyd. 2s Oxford

BR || Actual slide rule can be obtained for 1s

Exh

---

p. 115. Reviews of Magische Quadrate und Magische Parkette and G. Kowalewski's Kepler's solids & other games by E. G. P – In the latter mentions the 'colourisation game' with 30 little men whose coats & trousers are of diff. colours

Exh || Also cubes with diff. colours on their faces

---

p. 117

BR || J. M. Thomas – Theory of Eqns (MC – Graw Hill. 12s) Review

---

Modern developments in Fluid dynamics I. II

BR || Oxford Engineering Series 50s (Oxford)

S. Goldstein

$5x - 3y = d$, $-3y + 80 = d$.

$\frac{\cancel{32}^{16} \times 33}{\cancel{2}}$ $\quad 528$

$d = 80, 77, 74, 71, 68, 65, 62, 59, \ldots, -16$

96 $= 14, 11, 8, 5, 2, (32, 29, 26, 23, 20, 17, 14, 11, 8, 5, 2)(32, 29, 26, 23, 20, 17, 14, 11, 8, 5, 2,)$

$32, 29, 26, 23, 20, 17, \boxed{\cancel{14, 11, 8, 5, 2}}$

$(2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32,)(\quad ,, \quad)(\quad ,, \quad)$

$d = 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32$

altogether $11 \times 11 = 121$ cases.

By Σ method, $\Sigma x = \Sigma y = 528$, $4 \cdot 528 = 33c$, $c = 64 = 31$.

$\cancel{64 \pmod 3} \equiv 31 \pmod 3 = 1, 4, 7, \ldots 31$.

$2 \cdot 528 = 33d$, $d = 32$.

$32 \pmod 3 = 2, 5, 8, \ldots 32$

Here both methods tally.

$\frac{528}{33} = \frac{48}{3} = 9$

416
251
165

$-15x + 35y = 155$
$15x - 9y = 96$
$26y = 251$

48
32

$-3x + 7y = 31$
$5x - 3y = 32$
$5x = 80$
$x = 16$

$\frac{\cancel{34}^{17} \times 35}{\cancel{2}}$

284
33
327
33
350
33
383
33
416
$y = 16$

$n = 33$, with $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ a. d is $x = c$, $c = 16$
l. d is $-3x + 2y = d$. Σ gives $33d = -528 = -16 \equiv 17$.

$-16 \pmod 3 \equiv 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32$.

$-1, -4, -7, -10, -13$
$32, 29, 26, 23, 20$

$-3x + 32 = d$, $d = (32, 29, 26, 23, 20, 17, 14, 11, 8, 5, 2)\ -1, -4, \ldots -64$.

$(32, 29, \quad - \quad - \quad 2)$

$(32, 29, \quad - \quad - \quad 2)$.

96
32
64
$-34, -35$

By taking all values $-16 \pmod 3$ from 0 to 32, we get the same result by both methods.

$n = 35$. $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ $c = 17$.
$-3x + 2y = d$. $\quad 35d = -17 \times 35 \Rightarrow d = -17 \equiv 18$.

$d = 18$.
$-3x + 2y = 18$.
$2y = 18 + 51 = 69$ $\quad 34$
$y = 17$ gives $\quad 35$
$(x, y) = (17, 17)$
gives associative case

By the ad hoc method $d = 0, 1, \ldots 34$ obviously.

~~18 (mod 3) = 3, 8, 13, 18, -3, -7, -12, -17, -22, -27, -32, -37, -42, -47~~
~~(33, 28, 23, 18, 13, 8, 3, 33, (3, 8, 13, 18, 23, 28, 33)~~

Amer. math. monthly : Jan 1937.

p. 4. Address by R. P. Agnew on Convergence in the mean and Lebesgue integration – Read in full on 16/3/39

p. 33 Repeating designs in surfaces of negative Curvature by C. A. Richmond. Interesting surfaces. Talks of a Lobachefskian shawl – Ref. to A. D. Bradley's Geometry of repeating designs (Teachers College, Columbia Univ., New York, (933)

Exch

ibid : 7/37. p. 61. R. L. Wilder – Address on some unsolved problems of topology :

(Defns):

(1) Homeomorphism is (1,1) correspondence preserving limit pts.

(2) Topology (plane) as 'rubber sheet geometry'.

(3) Connected point set – at least one subset contains a limit point of the other.

(4) Closed set if it contains all its limit points

9, 43, 52, 86, 120, 129, 163, 197, 206, 240, 274, 283, 317 $= 21 \mid 9$

326, 360, 394, 403, 437, 471, 480, 514, 548, 557, 591, 625 $= \frac{5706}{7825}$ ✓

$d = 1$ also works.

$c = 12$, $d = 0, 1, 2, \ldots 24$. ie 25 cases.

$x = 12$,

$-3x + 2y = 0, 1, \ldots 24$ } ~~$(x, y) = (12,$~~

$2y = 3x + d \to 2y = 36, 37, 38, \ldots 60$.

$y = 18, 6, 19, 7, 20, 8, 21, 9, 22, 10, 23, 11, 24, 12, 0, 13, 1, 14, 2, 15, 3, 16, 4, 17, 5$ // again 0 to

~~$(12, 18), (12, 6), (12, 19), (12, 7)$~~, $(12, 0), (12, 1) \ldots (12, 24)$

$\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ $\begin{matrix} i = x + y = 12 \\ j + 2x - y = 12 \end{matrix}$ $\left.\begin{matrix} i = 12 + x - y = 24 - y \\ j = 12 - 2x + y = -12 + y \end{matrix}\right\}$

add 9 parts if determinant < 0

$(i, j) = (24, -12), (23, -11), (22, -10), (21, -9), (20, -8), (19, -7), (18, -6), (17, -5), (16, -4), (15, -3), (14, -2)$

$(13, -1), (12, 0), (11, 1), (10, 2), (9, 3), (8, 4), (7, 5), (6, 6), (5, 7), (4, 8), (3, 9), (2, 10), (1, 11), (0, 12)$

$n = 33$. with $\begin{pmatrix} 1 & 2 \\ 4 & -5 \end{pmatrix}$ $\begin{matrix} u \cdot d \text{ is } -3x + 7y = c \\ l \cdot d \text{ is } 5x - 3y = d \end{matrix}$ } By

$m = 16$

$-48 + 7y = c$, $c = -21, \ldots$ pwis $c = 0, \ldots 32$.

$-3x + 112 = c$, $c = 112, 109, 106, 103, 100, 97, \ldots 16$.

112
96
16

$\equiv 13, 10, 7, 4, 1, 0, 28, 25, 22, 19, 16, 13, 10, 7, 4, 1$

$31, 28, 25, 22, 19, 16, 13, 10, 7, 4, 1, 31, 28, 25, 22, 19, 16, 13, 10, 7, 4, 1$.

49
66
31

64
33

$= (1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31), (1, 4, 7 \ldots 31), (1, 4, 7 \ldots 31)$.

$c = 1, 4, 7, \ldots 31$ //

(5) Continuum if both closed and connected.

(6) ~~Bonne~~ Biconnected set is any connected set which cannot be decomposed into two disjoint connected subsets.

(7) Dispersion point is ~~every connected~~ point common to every connected subset.

(8) homogeneous continuum M if given any two points x & y there is a homeomorphism of M into itself in which x and y are corresponding pts (eg. x, y points on a circle)

(9) locally connected continua M if for each P of M there exists $\delta_{P\epsilon} > 0$ for any $\epsilon > 0$, such that a connected subset of M in $S(P, \epsilon)^*$ contains all points of M in $S(P, \delta_{P\epsilon})$

(10) (This property characterises continua that are continuous curves or Peano or Jordan curves)

(10) Prime part of a continuum M is a subcontinuum K such that M fails to be locally connected at every point of K, and which is not a proper subset of another subcontinuum of M having the same property.

(11) acyclic curve is a bounded Cont. curve not containing a simple closed curve.

(12) Imbedding of a topological configuration C in a

31300

7825

$3x = 5$.

$-3x + 2y = 0, 1, \ldots 24$. $\quad 2 \quad 3x = 4$. $\quad 3x \equiv 4$.

$3x -$

~~125~~ 313

$\frac{1}{2} \cdot 25 \cdot 626$

$d = 0$, $3x = 2y$, $y = 0, \ldots 24$, ~~$x = 0$~~, $3x = 0$, $3x = 2$, $3x = 48$.

~~$x = 0, 17, 9, 1, 18, 20$~~, ~~$x = 0, 9, 1, 18, 27$~~, 14 $\quad$ 63

$3x = 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48$

16 $\quad x = 0, 9, 18, 2, 11, 20, 4, 13, 22, 6, 15, 24, 8, 17, 1, 10, 19, 3, 12, 21, 5, 14, 23, 7, 16$

~~(0,0), (1,9), (2,18), (3,2), (4,11)~~, $\quad$ (24, 16)

(0,0), (9,1), (18,2), (2,3), (11,4), (20,5), (4,6), (13,7), (22,8), (6,9), (15,10), (24,11), (8,12)

(17,13), (1,14), (10,15), (19,16), (3,17), (12,18), (21,19), (5,20), (14,21), (23,22), (7,23), (16,24)

1, 35, 69, 78, 112, 146, 155, 189, 223, 232, 266, 300, 309 = 2115

343, 352, 386, 420, 429, 463, 497, 506, 540, 574, 583, 617 = 5710

7825

$d = 0$ works & I expect $d = 1, 2, \ldots 24$ all work

but the Σ method with ~~(mod 5)~~ no need to take this mod 5 gives only $d =$ 3, 8, 13, 18, 23, 28 //

So I think my ad hoc method is better & works in all cases. It has to be justified however.

$d = 1$:

$-3x + 2y = 1$.

$3x = 2y - 1$, $y = 0, 1, 2, 3, \ldots 24$

$3x = -1, 3x = 1, 3x = 3, 3x = 5, \ldots 3x = 47$.

~~$x = 8, 17, 1, 10, 2, 19, 11, 3, 20, 12, 4, 21, 13, 5, 22, 14, 6, 23, 15, 7, 24, 16, 8, 0, 17, 9, 1, 18,$~~

~~$10, 2, 19, 3$~~,

$3x = -1, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47$

$x = 8, 17, 1, 10, 19, 3, 12, 21, 5, 14, 23, 7, 16, 0, 9, 18, 2, 11, 20, 4, 13, 22, 6, 15, 24$

(8,0), (17,1), (1,2), (10,3), (19,4), (3,5), (12,6), (21,7), (5,8), (14,9), (23,10), (7,11), (16,12), (0,13)

(9,14), (18,15), (2,16), (11,17), (20,18), (4,19), (13,20), (22,21), (6,22), (15,23), (24,24).

space S a preimage of C in S means "does S contain a homeomorph of C?"

(13) A set E is called a metric space if for x, y we associate $d(x,y)$ such that $d(x,y) = 0$ if $x = y$ and only so and $d(x,y) \leq d(x,z) + d(y,z)$ for all x, y, z of E

(14) Separable metric space if E contains a denumerable set M such that every element of E either belongs to M or is a limit-point element of M.

(15) Hilbert metric space has elements as all sequences $(x_1 \ldots x_n \ldots)$ of positive real nos. and whose metric is defined by $d(x,y) = \sum_1^\infty |x_n - y_n|/2^n$.

(16) A space is compact (Fréchet) if every ∞-subset of it has at least one limit point.

(17) Cyclic curve if each pair of its points lies on a simple closed curve of M.

Problems

(1) Does there exist in every biconnected set a dispersion point? — (not solved)

(2) If the simple closed curve the only bounded

(144)

* See J.W. Alexander: Ency. Brit. 14th ed. (Manifolds)

(1) The most general separable metric space may be imbedded in the fund. Δ^d of Hilbert space (Urysohn) (2)

(2) Every n-dimensional compact metric space may be imbedded in a euclidean space of $(2n+1)$ dimensions (Menger-Nöbeling)

(i.e. curves can be pictured in 3-space topologically)

homogeneous continuum in the plane?

Mazurkiewicz showed the theorem true (ie yes) for locally connected continua.

For sets imbedded in higher dimensional space (eg even if the continuum be one dimensional it is not necessarily a simple closed curve.

(3) If M is a continuum which is homeomorphic with each of its proper sub-continua; is M an arc?

(4) When may a homeomorphism between two simple closed surfaces be extended to the bounded domains of which they form boundaries?

(Alexander has constructed examples to the contrary)

(5) Under what conditions will a domain bounded by a simple closed surface be homeomorphic with the set of points $x^2+y^2+z^2<1$ in cartesian 3-space.

(6) To find topological invariants characterising imbeddability in a space S.

Problem solved for $S = E_1$, partially for $S = E_2$

(7) Combinatorial topology - To characterise a closed 2-dim. manifold* completely it is sufficient to know its

* Write to Editor Amer. Math. monthly
9 Club Sect. ie F. W. Owens
462, East Foster Ave
State College, Pa.

27 (13) It appears the method on p. 73 which I called mechanical appears to be the most reliable inspite of the labour involved. 9

$\frac{26 \cdot 27}{2} = 471$

Take $n = 27$ with $\begin{pmatrix} 1 & 2 \\ 4, & -5 \end{pmatrix}$ $\left.\begin{matrix} -3x + 7y = c \\ 5x - 3y = d \end{matrix}\right\}$ $27c = 4 \cdot 471$, $c = 52 \equiv 25$. $27d = 2 \cdot 471$, $d = 26$.

52, 24, 21

25 (mod 3) = 1, 4, 7, 10, 13, 16, 19, 22, 25

15 (mod 3) = 1, 5, 4, 3, 2, 1. 26 (mod 3) = 2, 5, 8, 11, 14, 17, 20, 23, 26

$-39 + 7y = c$, $c = -39, -32, -25, -18, -11, -4, 3, 10, 17, \ldots$ 143.

$\equiv 15, 22, 29, 9, 16, 23, 3, 10, 17, 24, 4, 11, 18, 25, 5, 12, \ldots$

$-39 + 182$ 143 $\quad 54 \quad 39$ $\quad -3x + 91 = c$, $c = 91, 88, 85, 82 \ldots$ 13.

$7 \cdot 13$ 78 $\quad 91 \quad 78 \quad 13 \quad 79 \quad 54 \quad 25$

$= 10, 7, 4, 1, 25, 22, 19, 16, 13, 10, 7, 4, 1, 25, 22, 19, 16, 13, 10, 7, 4, 1,$
$25, 22, 19, 16, 13$

67 52 $\quad$ c has no 9 values by mechanical method
d by above ~~method~~ also Σ method with (mod 3) also same 9 values.

$5x - 3y = d$, $-39 + 5x = d$ gives $d = 0, 1 \ldots 26$.

$65 - 3y = d \rightarrow d = 65, 62, \ldots 2, -1, -4, \ldots, -13$.

78 $y = 21$ $\quad 78 \quad 65 \quad 13$

$\equiv 11, 8, 5, 2, 26, 23, 20, 17, 14, 11, 8, 5, 2, 26, 23, 20, 17, 14, 9,$
$26, 23, 20, 17, 14, 11, 8, 5, 2$

59 56 53

$= 2, 5, 8, \ldots 26$

d has same 9 values by both methods //.

Connectivity & whether it is orientable or not (2-sided or 1-sided)
Thus torus & 2-sphere are both orientable but sphere of
connectivity 0 and torus of connectivity 2. On the other hand the
projective plane has connectivity one and it is not orientable
For 3-dim. manifolds no complete set of topological invariants
has ever been found, and at present it appears quite
possible that none may ever be found (Ltr of A. Church).
(8) "Hauptvermutung" of combinatorial topology that
given two subdivisions S_1 & S_2 of an n-manifold it is
possible by further subdivision to reduce them to same pattern.

---

ibid March 37: p. 137. Hardy's lecture on Ramanujan

---

p. 173. Loan library of stunts – For the use of clubs there
are now being collected manuscripts of mathematical
plays, mathematical songs, games, tricks, competitions
and stunts of various types. Contributions welcomed.
Announcement of availability will be made later.

Ent*

Note

Advt re. Sphinx: Became a personal subscriber

$n=9$ 26, 33, 40, 47, 5, 12, 19, 5, 12, 19,

(N1) $\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$ $y = c$ (u.d) $0+1+\ldots+20$.

$2x - 3y = d$ (l.d)

$72 - 108 = 9d$, $9d = -36 = d \equiv -4 \pmod 3$, $d = 2, 5, 8$

$19 \pmod 7 = 5, 12, 19$.

1, 4, 7, 10, 13, 16, 19

$19 \pmod 3$.

Let us try $n = 21$. (with the second case use for $n = 9$, p. 70).

$\begin{pmatrix} 1, & 2 \\ 4, & -5 \end{pmatrix}$ $-3x + 7y = c$ (u.d) $20 \pmod 3$ 2, 5, 8, 11, 14, 17, 20.

$5x - 3y = d$. (l.d)

$21 = 2m+1$, $m = 16$

$-3\Sigma x + 7\Sigma y = 21c$. $21c = 4 \cdot 210$ $c = 40 \equiv 19$.

$-3x + 70 = c$ $5\Sigma x - 3\Sigma y = d$, $21d = 2 \cdot 210$, $d = 20$.

40

5

$c = 70, 67, 64, 61, \ldots 10. \equiv$ ~~7, 4, 0, 18, 15, 12, 9, 6, 3, 0, 18, 15, 12, 9, 6, 3, 0, 18, 15, 12, 9, 6,~~

$\equiv 7, 4, 1, 19, 16, 13, 10, 7, 4, 1, 19, 16, 13, 10, 7, 4, 1, 19, 16, 13, 10$ //

$210 = 21$ $d = 20 \pmod 3$ 2, 5, 8,

$-30 + 7y = c$ $c = -30, -23, -16, -9, -2, 5, 12, 19, 26, 33, 40, 47, 54, 61, 68, 75, 82,$

$89, 96, 103, 110.$

$\equiv 12, 19, 5, 12, 19, 5, 12, 19,$

$5, 12, 19, 5, 12, 19, 5, 12, 19, 5, 12, 19, 5.$

$\equiv 5, 12, 19$ // only common value is $c = 19$ //.

$20 \pmod 5$

$= 0, 5, 10, 15, 20$

$-5, -10, -15, -20, -25, -30, -35$

$-40, -45, -50, -55, -60, -65$

$-70, -75, -80$

$= 0, 5, 10, 15, 20, 16, 11,$

$5x - 3y = d$

$5x - 30 = d$, $d = -30, -25, -20, -15, -10, -5, 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55$

$60, 65, 70$

$\equiv 12, 17, 1, 6, 11, 16, 0, 5, 10, 15, 20, 4, 9, 14, 19, 3, 8, 13, 18, 2, 7.$

$50 - 3y = d$, $d = 50, 47, 44, 41, 38, 35, 32, 29, 26, 23, 20, 17, 14, 11, 8, 5, 2,$

$-1, -4, -7, -10$

$\equiv 8, 5, 2, 20, 17, 14, 11, 8, 5, 2, 20, 17, 14, 11, 8, 5, 2, 20, 17, 14, 11$

$\equiv 2, 5, 8, 11, 14, 17, 20$

Subn 35 francs (Belgique), Address: Administration "The Sphinx", 75 Rue Philippe-Baucq, Bruxelles (Belgique)

---

p. 234 – Note on Pohlke's theorem on ∥ projections in descpt. geom.

---

p. 243 – Club reports, Math. Club, Creighton Univ – The Rigge compound harmonic motion machine was demonstrated

Exh

Loan library of shunts – Those wishing the use of any item from the collection should write to this Dept, enclosing return postage & pledging the return of manuscripts within two weeks of their receipt

Exh

Math. nuts ($3.50)
" Wrinkles ($3.00)
S. E. Jones, Author & publisher, 1104 Caldwell Lane, Nashville, Tenn

Bk Exh

$c = 7$, $7y = 3x + 7$, $7y = 7, 10, 13, 16, 19, 22, 25, 28, 31$

$y = 1, 4, 7, 1, 4, 7, 1, 4, 7$

$(0,1), (1,4), (2,7), (3,1), (4,4), (5,7), (6,1), (7,4), (8,7)$

$10, 38, 66, 13, 41, 69, 16, 44, 72$

$5 \pmod 3$

$= 2, 5, 8, 11, 14, 17, 20, 23, 26$

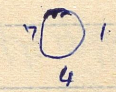
$= 2, 5, 8, 2, 5, 8, 2, 5, 8$

$5x - 3y = d$. $5x = 3y + d$.

$5x = 3y + 2$, $5x = 2, 5, 8, 11, 14, 17, 20, 23, 26$, $x = 4, 1, 7, 4, 1, 7, 4, 1, 7$.

$(4,0), (1,1), (7,2), (4,3), (1,4), (7,5), (4,6), (1,7), (7,8)$

$5, 11, 26, 32, 38, 53, 59, 65, 80$



$5x = 3y + 5$, $5x = 5, 8, 11, -$; $x = 1, 7, 4, 1, 7, 4, 1, 7, 4$

~~(0,1), (1,7), (2,4), (3,1), (4,7), (5,4), (6,1), (7,7), (8,4) = 10, 65, 39, 13, 68, 42, 16, 71, 45~~

$(1,0), (7,1), (4,2), (1,3), (7,4), (4,5), (1,6), (7,7), (4,8)$

$2, 17, 23, 29, 44, 50, 56, 71, 77$

$5x = 3y + 8 \rightarrow (7,0), (4,1), (1,2), (7,3), (4,4), (1,5), (7,6), (4,7), (1,8)$

$= 8, 14, 20, 35, 41, 47, 62, 68, 74$ in l.d.

37	64	10
65	11	38
12	39	66
40	67	13
68	14	41
15	42	69
43	70	16
71	17	44
18	45	72

5	2	8
11	17	14
26	23	20
32	29	35
38	44	41
53	50	47
59	56	62
65	71	68
80	77	74

$(1,7), (1,1), (1,4)$

$(4,7), (4,1), (4,4)$

$(7,7), (7,1), (7,4)$

one with $(4,4)$ in centre $\rightarrow$ associate

Vide fig on p. 16 of Bk. 17

ibid May 1937, Club reports - Math. Club, Regis College - Problems set - best solns get prizes

ibid Aug-Sept: p. 413 "Mechanical & graphical Calendars" by Prof W. K. Nelson, Univ. of Colorado. ASK for reprint

Esh

p. 476. "Log in Rhythm" magazine sponsored by the Bronx Math. Club, Hunter College. "The Sad tale of Miss Poly Gon" is an amusing romance in the magazine

Oct p. 495: R. E. Langer on René Descartes.

p. 521: Meaning & function of a picture by W. H. Roever Washington University — allies to Varasiya Rao's paper in "Current Science"

Esh Advt: Keuffel & Esser Co, 127 Fulton St, New York Write for descriptive circular of slide rules.

$\Sigma y = 105$, $10\Sigma y = 1050 \equiv 15d - (9+18+\dots+126)$

$15d = 1995$, $d \equiv 133 \equiv 13$ $= 15d - 9\times105 = 15d - 945$

$9\times105 = 15d - (10+20+\dots+140)$, $15d - 10\times105$

$15d \equiv 19\times105 = \cancel{133} \equiv \cancel{13}$.

$d \equiv 133 \equiv 13$ — This makes sense

13 (mod 3) = 1, 4, 7, 10, 13
13 (mod 5) = 3, 8, 13

108
18
126

$n = 9$,

$-5x + 6y = 7$
$9x + 10y = 13$.

$-45x + 54y = 63$
$45x + 50y = 65$
$104y = 128$ $y = 7, 7$

128

$-5x + 42 = 7$
$-5x = -36$

$\frac{8\times9}{2}$

324

(i) $x = c$,

$-3x + 2y = d$.

$2y = 3x + d$, $x = 0, 1 \dots 8$, $2y = d, 3+d, 6+d, \dots 24+d$.

$2\Sigma y \equiv 9d + 108$ (mod 3) for magic series Σy should $= (369-45)/9 = 36$

$72 \equiv 9d + 108$, $9d \equiv -36$, $d \equiv -4 \equiv 5$ (mod 3). $d \equiv 5$ (mod 3).

$3x = 2y - d$, $y = 0, \dots 8$, $3x = -d, 2-d, \dots 16-d$] $d \equiv 5$ (mod 3)
$d = 2, 5, 8, -1, -4, -7, -10, -13, -16$
2, 5, 8, 8, 5, 2, 8, 5, 2

$3\Sigma x = 72 - 9d$, $108 = 72 - 9d$, $9d \equiv -36$, $d \equiv -4$ (mod 3)

$d \equiv -4$ (mod 3), $d = 2, 5, 8$

$d = 2, 5, 8$

(ii) $-3x + 7y = c$
$5x - 3y = d$

$7y = 3x + c$. $7\Sigma y = 3\Sigma x + 9c$.

$3x = 7y - c$

$4\cdot36 = 9c$, $c \equiv 16$ (mod 3).
$c = 1, 4, 7$

$\begin{pmatrix} 1, & 2 \\ 4, & -5 \end{pmatrix}$

$5x - 3y + d$, $9d \equiv 2\cdot36$

$3\cdot36 = 7\cdot36 - 9c$, $9c \equiv 16$ (mod 3), $c = 1, 4, 7$, 10, 13, 16

1, 4, 7

$d \equiv 8$ (mod 3), $d = 2, 5, 8$, $-1, -4, -7$,

$c = 1, 4, 7, -2, -5, -8, -11, -14, -17$

1, 4, 7, 7, 4, 1, 7, 4, 1.

16 (mod 9) → all 9 values

8 (mod 5)
$= 3, 8, -2, -7, -12, -17, -22, -27, -32$
$= 3, 8, 7, 2, 6, 1, 5, 0, 4$

$c = 1$, $-3x + 7y = 1$, $7y = 3x + 1$, $x = 0, 1, \dots 8$

$7y = 1, 4, 7, 10, 13, 16, 19, 22, 25$

$y = 4, 7, 1, 4, 7, 1, 4, 7, 1$.

(0,4), (1,7), (2,1), (3,4), (4,7), (5,1), (6,4), (7,7), (8,1).

37, 65, 12, 40, 68, 15, 43, 71, 18

64, 11, 39, 67, 14, 42, 70, 17, 45

$c = 4$. $7y = 3x + 4$, $7y = 4, 7, 10, 13, 16, 19, 22, 25, 28$

$y = 7, 1, 4, 7, 1, 4, 7, 1, 4$

(0,7), (1,1), (2,4), (3,7), (4,1), (5,4), (6,7), (7,1), (8,4).

19/3/39. Zs. f. ang. Mech. Bd 19, Feb 1939

p. 63. Sommerfeld's 70th birthday notice by L. Prandtl.

" Timoschenko's 60th " N. Flügge

Proc. Phys-Math. Soc. Jap Vol 21, No. 1, p. 1. Kobayasi & Okayama on Yukawa particle (refers to Heisenberg 1938 paper, Zs. f. Phys. 110 (1938), 251

Math. Ann. 116 Bd (3 Heft). p. 374. R. M. Morris on Internal problems of 2-dim. potential theory — Ref. to a paper of B. R. Seth

---

p. 422. Unitary invariant selfadjoint operators by F. Wecken

---

p. 463. Simple topological proof of the fundamental theorem of algebra by Wei-Liang Chow

~~Math Zs 45 Bd 1 Heft (20/4/39)~~

Bull. Soc. math. France t. 66 - Fasc. 3-4,

p. 164. Demonstration of a theorem of Fermat by M. S. Wachs ie that $x = 2, y = 5$ is the

1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43
= 1, 4, 7, 10, 13, 1, 4, 7, 10, 13, 1, 4, 7, 10, 13, ...

0 + 6t = +84
0 + 6(14 = 14)

0 + 5t = 70
0 + 5(14 = 14)

$-3x + 2y = d$.

$d = 0$

$3x = 2y - d$. $3x = 2y$

(0, 0)

The method obtains on p. 73 of texts c & d in terms of n composite appears purely mechanical & lacks argument.

Taken $n = 15$ $-5x + 6y = c$ (i.e. d.

$9x + 10y = d$ (i.e. d

$\begin{pmatrix} 2 & 8 \\ 7 & 2 \end{pmatrix}$ $56 - 4 = 52$

$5 = \frac{1}{2} \cdot 15 \cdot 14 = 105$.

1695
120
1585
105

$6y = 5x + c$. $x = 0, 1, \ldots 14$. $6y \equiv c, 6y \equiv 5 + c, \ldots 6y \equiv 70 + c$.

$y_0 \quad y_{14}$

$5x = 6y - c$, $y = 0, 1, \ldots 14$, $5x \equiv -c, 5x \equiv 6 - c, \ldots 5x \equiv 84 - c$.

$y_0 + y_1 + \ldots + y_{14} = 105$; $6y_0 + \ldots = 630 \equiv 15c + 525$ $15c = 105$ $c = 7$.

630
525
105

$x_0 + x_1 + \ldots + x_{14} = 105$, $5x_0 + \ldots = 625 \equiv 630 - 15c$ $15c = 105$ $c = 7$

$7 \pmod 5 = 2$

$7 \pmod 5 = 2, 4, 1, 7$

$10y = d - 9x$. $x = 0, -14$, $10y \equiv d, d-9, d-18, \ldots d-126$
$9x = d - 10y$, $y = 0, -14$, $9x = d, d-10, d-20, \ldots d-140$

Bolmen Zbl. f. math. 1934, Heft 14 Heft, name omitted are H. Bohr, R. Conrad, G. H. Hardy, J. J. Tamarkin, P. Valeri on D. Neugebauer (editor) d in these syllabic values are

K. Beckel, E. Bonjean, H. Haase, F. Levi, W. Scherfenberg and E. Wilcke (Giessen).

$7 \pmod 5 = 1, 4, 7, 10, 13$
$-2, -5, -8, -11, -14, -17, -20$
$-23, -26, -29, -32, -35$
$= 1, 4, 7, 13, 80, 7, 4, 1, 13, 10.$
$7, 4, 1, 13, 10.$

$7 \pmod 5 = 2, 7, 12$
$17, 22, 27, 32, 37, 42, 47, 52$
$57, 62, 67, 72$
$= 2, 7, 12, 2, 7, 12, 2, 7, 12, 2, 7, 12, 2, 7, 12$

only soln of $(2x^2-1)^2 = 2y^2-1$ (except, (0,1) & (1,1))

Math. Zs. 45. Bd. Heft 1

p. 97. Dr G. Palamà – Laplace's Tr & Laguerre Polynom.

---

p. 142. Expansion in terms $Q_n(x)$ by D. P. Banerjee

Jahr. Fort. d. Math. Bd. 63, (1937) Heft. 5

p. 708. My article on Generalised action-fns
Extracted by Golab.

---

p. 711. on the double vector product formula by L. Chatelun
Bull. math. Fac. Sci, grandes Ecoles

$$(a\times p)^2 = a^2p^2-(ap)^2 \text{ and } (a\times q)^2 = a^2q^2-(aq)^2$$

$$[a\times(p-q)][a\times(p+q)] = a^2(p-q)(p+q) - [a(p-q)][a(p+q)]$$

Let $p-q=b$, $p+q=c$, $c\times(a\times b) - [(cb)a-(ca)b] = t$.
Accordingly $ta=0$. Also $tc=0$ and $t\cdot a\times b=0$. Hence $a, c, a\times b$ are planar & so must $t=0$

---

p. 726. Articles of C. Agostinelli:

$a(2-b)-b(1-a) = 2a-b \neq 0$.

-1,

$a(1-b)-b(1-a) = a-b \neq 0$.

$a \pm b \neq 0,\ a' \pm b' \neq 0$.

$\begin{pmatrix} a & 1-a \\ b & 1-b \end{pmatrix}$ $1-2$

$\begin{pmatrix} 2 & -1 \\ 1 & 1 \end{pmatrix}$ $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$

$\begin{pmatrix} -1 & 1 \\ 2 & -3 \end{pmatrix}$

$(1,2)$ BM

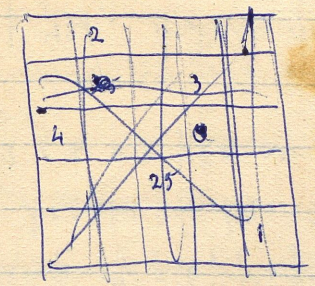
$(-1,2)$

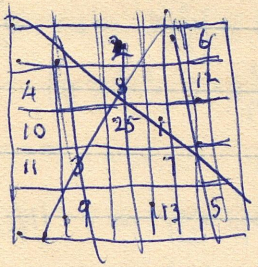
$\begin{pmatrix} -1 & 1 \\ 2 & 2 \end{pmatrix}$

$-1, 3$
$2, -2$

$(2,0)$

$\begin{pmatrix} -1 & -1 \\ 2 & -2 \end{pmatrix}$ $(-2,0)$



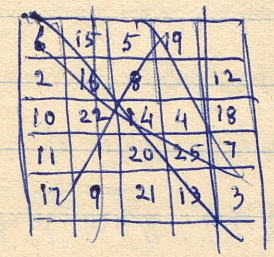


9	21	13	5	17
15	2	19	6	23
16	8	25	12	4
22	14	1	18	10
3	20	7	24	11

2	14	21	8	20
23	10	17	4	11
19	1	13	25	7
15	22	9	16	3
6	18	5	12	24

$\begin{pmatrix} -1 & 2 \\ 2 & -3 \end{pmatrix}$

6	15	5	19	
2	16	8		12
10	22	14	4	18
11	1	20	25	7
17	9	21	13	3



6	18	5	12	24
2	14	21	8	20
23	10	17	4	11
19	1	13	25	7
15	22	9	16	3

16	4	12	25	8
14	22	10	18	1
7	20	3	11	24
5	13	21	9	17
23	6	19	2	15

22, 10, 14, 18, 1

$(1,4), (4,1), (3,2), (2,3), (0,0)$

$x = 4$. $-12+2y = d$.

$-3x+2y \equiv d$

$2y = d+3x$.

$-3x+2 = d$

$2, 8, 5, 2, 8, 5$

$ax + a'y \equiv c$.

$\begin{pmatrix} -1 & 2 \\ 2 & -3 \end{pmatrix}$ $-x+2y \equiv c$

$(x,y) = (0,3), (3,2), (1,1), (4,0), (2,4)$.

$2y = 1+x$.

$0, 6, 1, 1, -4, 6 \equiv 1$

$d = 3$

$3x+3 = 2y$

$2y = 25$

$d = 1$

$2y \equiv 1, 2, 3, 4, 5$ $y \equiv 3, 1, 4, 2, 0$ $(0,3)\ (1,1), (2,4), (3,2), (4,0)$

$3x+4 = 2y$.

$3x+5 = 2y$

$2y = 3x+1$. $(0,5), (1,2), (2,8), (3,5), (4,2), (5,8), (6,5), (7,2), (8,8)$ ✗

$2y = 7$

$2y = 3x+2$

5 $\frac{45 \times 9}{405}$ $(0,1), (1,7), (2,4), \ldots$

36×9 $(0,6), (1,3), (2,0), \ldots$ ✗ $(0,2), (0,8), (1,5), \ldots$ ✗ $(0,7), (1,4), (2,1), \ldots$ ✓ (B)

(a) On the H-J. eqn by separation of variables
Ist. Veneto Sci. Lett. Arti Atti. 96, 151-61

(b) - Do - Mem. Accad. Sci. Torino I (2), 69, 5-54

(c) on corresp. dynam. systems. Mem. Ist. Lombardo Sci. Lett
cl. Sci. mat nat
23, 191-240

(d) " (ibid)

---

9 Ibid. Bd. 61 II (1935) Heft. 4, p. 1457
Quaternions, Semi-Vectors & Spinors by J. Blaton
Z. f. Phys. 95, 337-54.

p. 1473. My article in Z.s.f. Physik by Prange - Calls it 'Bekannte'.

Bull. des Sci. math. t. 63 - Feb 39.
p. 33 - Review of Rashevsky's Math. Biophysics (Chicago)

by S. Lefschetz who says in conclusion
« Cet ouvrage offre un champ d'application nouveau et des plus vastes. Jusqu'à présent il est vrai, l'appel est plutôt à la technique mathématique tout à fait classique. Avec le progrès toutefois, il n'y a nul doute que l'histoire de la physique mathématique

Silverman Physics - Book - Waldhe
Tower

5	14	23	7	16
22	6	15 20	4	13
19	3	12	21	10
11	25	9	18	2
8	17	1	15	24

$a\begin{pmatrix}2 & -1\\ 1 & -2\end{pmatrix}$

6	3	25	17	14
20	12	9	1	23
4	21	18	15	7
13	10	2	24	16
22	19	11	8	5

$\begin{pmatrix}-1 & 2\\ -2 & 1\end{pmatrix}$

$\begin{pmatrix}a & 1-a\\ b & -1-b\end{pmatrix}$

$-a(1+b)-b(1-a)$

$-(a+b)$

$\{i+ax+(1-a)y,\ j+bx-(1+b)y\}$

$i+4a+4(1-a),\ j+4b-4(1+b)\}$

$(i+4, j-4)$

(0,0), (1,1), (2,2), (3,3), (4,4)

(2,1), (1,3), (0,0), (4,2)

(3,4)

(10,10)

$\Sigma x_0 + n\Sigma y + n$

$\Sigma x + 5\Sigma y = 60$ $\quad x + 5y = 60$ $\quad 5y = 60 - x$, $\quad x=0, y=12$

$x=5, y=11$

$x=10, y=10$

$x=15, y=9$

$x=20, y=8$

$x=25, y=7$

$x=30, y=6$

$x=35, y=5$

$x=40, y=4$

$x=45, y=3$

$x=50, y=2$

$x=55, y=1$

$x=60, y=0$

$y=0,1,2,3,4.$

$x=0,1,2,3,4$, $y=12,11,10,9,8$

(1,4), (3,3), (0,2), (2,1), (4,0)

(2,2), (4,4), (2,1), (3,3), (4,0)

(2,2)

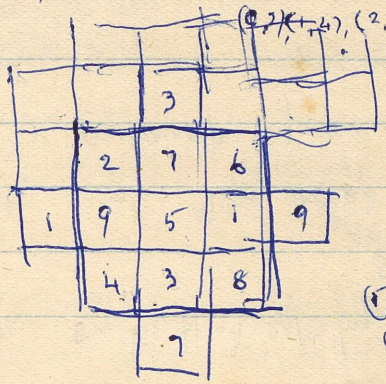
(3,2)

1, 5

6, 10

16, 21

22,



(1,3)

(1,1)

(1,-1)

(1,3)

(0,1)

ne se répète : de la biologie surgiront des idées destinées à enrichir la science mathématique pure".

Comptes Rendus U.S.S.R Vol 20. (1938). No. 6.

p. 415 – Gravitational instability of a material sphere by A. B. Severny – Jeans's work – use is made of a theorem of "Eigenwerte" given in Courant-Hilbert

---

p. 431. Vs. Černiajev – on H_2, D_2 – new reprint –
Lab. of Mol. & At. Spectroscopy
State Optical Inst, Leningrad

Nos. 7-8. p. 511, N. G. Tougaroff, lines on a surface whose geodesic torsion & normal curvature are related linearly
(DZerjinsky École Maritime du Génie Militaire, Leningrad)

---

p. 551 – Scattering of neutrons in ferromagnetics. by A. Migdal

Vol. 21 p. 31. Iwanenko* – Simple applications of the Proca Potentials – Mentions Born's
(Nos 1-2)

13	10	2	15	
		11	8	5
6	3	11		
	12	9	1	14
4	12			7

$(3+2a, 2+2b)$ for q. $a \neq 0, -1$, $b \neq 0$.

$a=1, b=2$ $(5,6) = (0,1)$

$(1-2a, 1-2b)$ for 17.

$(-1,-2), (4,3)$ trivial ✓

Checkerboard

P.N. Kelkar's Physical Institute of U.S.A.

Astronomy & Science of the U.S.A.

Physiology Museum.

$a=1, b=2$, $(4+x-2y, 2+2x-2y)$

q at $(-1,-2)$ or $(0,1)$

17 at $(-1,-4)$ or $(4,3)$

(3,3)

$(i,j) = (3,1)$ $(1,3)$.

$(2,-2)$

$a+a' = 2$, $b+b' = -2$ → $(2,6)$, $(3,1)$

$\begin{pmatrix} 1 & 1 \\ 1 & -3 \end{pmatrix}$ $\begin{pmatrix} 1 & 1 \\ 2 & -4 \end{pmatrix}$

Bom.

7	4	21	18	15
3	25	17	14	6
24	16	13	10	2
20	12	9	1	23
11	8	5	22	19

7	16	5	14	23
11	25	9	18	2
20	4	13	22	6
24	8	17	1	15
3	12	21	10	19

$\begin{pmatrix} -1 & 3 \\ 2 & -1 \end{pmatrix}$

$-1, 2$

$-2, 1$

Solomon Physique - Zeal. Jnd.

Tomark.

7	14	16	23	5
18	25	2	9	11
4	6	13	20	22
15	17	24	1	8
21	3	10	12	19

a ↓ n

$a+a' = 1$, $b+b' = -1$.

		25		
			1	

for K.M's only 2 cross terms (C & M)

N.B. R.M's other than K.M's are terrible for novels

$\frac{1}{q}(a \pm 1)(b \pm 2, 0)$

$(\pm 2, \pm 2)$ are all taboo

old theory as well as new reciprocity idea.

p. 34. A. Sokolov* – on the nature of the heavy electron.
~~Shows~~ States that integral spin means a complex ~~mass~~ particle, and using the methods of neutrino-theory of Jordan as modified by the author, shows that for $E \gg mc^2$, the electron & neutrino fly together forming a single particle, while for $E \sim mc^2$ they the particle disintegrates into electron & neutrino. This explains Blackett's observation that heavy electrons become common ones at energies of order $2 \cdot 10^8$ e.V. (200 m.V.)

ibid No. 3, p. 106 – ~~D~~G. Ig. Tamm* – Isotope shift of spectral lines & neutron-electron interaction. Bartlett suggested isotope-shift as a radius effect i.e. heavier isotope has larger radius & hence more loose electrical binding. Condon suggested a neutron-electron interaction as cause. Author talks both & makes calculations.

Also mentions pair production by heavy particles & suggestion of Zeller & Wentzel that interaction of heavy particles one to exchange of pairs of between them as

16	15	9	3	22
8	2	21	20	14
25	19	13	7	1
12	6	5	24	18
4	23	17	11	10

$a+a' = -2$, $b+b' = 2$.

$\begin{pmatrix} a & -2-a \\ b & 2-b \end{pmatrix}$

$\begin{pmatrix} 2 & 2 \\ 1 & 1 \end{pmatrix}$

$a \neq -2$, $b = 2$; $a \neq 0$, $b \neq 0$

$a(2-b) + b(2+a) = 2(a+b) \neq 0$

$(1\ 3\ 5^-)$

65
14
51

by 26
39

$15+9+14$
$16+9+14$

$c = (1-2-1)2 = 1$

$d = (1-1-1)2 = 3$

$(1-a-a')2 = 3$

$(1-b-b')2 = 3$

$2(a+a') = -1$, $2(b+b') = -1$

$a+a' = 2$, $b+b' = 2$

$\begin{pmatrix} a & -1-a \\ b & 1-b \end{pmatrix}$

$\begin{pmatrix} 2 & 2 \\ -1 & 2 \end{pmatrix}$

$a \neq 0, -1$

$b \neq 0, 1$

$a(1-b) + b(1+a) = a+b \neq 0$.

$(i+2x+2y,\ j-x+2y)$

$(4+2x+2y,\ 2-x+2y)$

$4+2x+2y = (3,1) = (2,1)$ 4

$(14,3) \equiv (4,3)$

$(0,1)$
$(4,3)$

$q = (3,1)$

$i4 = (3,2)$.

let i be $(4,2)$, 25 at $(0,2)$, $a+a' = -1$, $b+b' = 0$

$\begin{pmatrix} a & -1-a \\ b & -b \end{pmatrix}$

$a \neq 0, -1$, $b \neq 0$. $-ab + b(1+a) = b \neq 0$

$(4+2x+2y,\ 2+x-y)$

$q = (3,1)$
$(2,4)$.

$\begin{pmatrix} 2 & 2 \\ 1 & -1 \end{pmatrix}$ send them (a,b) back $(i+ax+a'y,\ j+bx+b'y)$

$(4+ax+a'y,\ 2+bx+b'y)$.

$13 = (3,2)$

~~Turfing a, a', b, b' for ways a 4 hits (x,y)~~

$(4+ax-(1+a)y,\ 2+bx-by) = \Phi$ only two could be superfluid.

$4+2a-2(1+a)$,
$2+2b-2b$

$(3,1)$, $(2,4)$
$(1,3)$.

$(4+3a-(1+a),\ 2+3b-b) = (3+2a,\ 2+2b)$ for q.

$(4+2a-(1+a),\ 2+2b-2b) = (a,\ 2-2b)$ for 1

$(4+a-3(1+a),\ 2+b-3b)$ for 17

$(1-2a,\ 2-2b)$ for 17 17 as $(3,-2)$, $(1,3)$

$(4,3)$ $(3,1)$ for 17

$3+2a = 1$
$2+2b = 3$
$a = -1$
$b = 3$

$5+2a = 3$
$2+2b = 4$

$a = 2$
$2b = -1$
$b = -1/2$

$a = -1$
$b = 2$

q at $(1,3)$

$\text{card} = (-1,2)$

$a = -1$, $2b = 1$
$b = 3$
$a = -2$, $b = 3/2$
absurd

the causse of nuclear forces.

Phys. Zs. Nr. 4, 40. J.

p. 140–41. Barbulescu – Special relativity.

Einstein postulates (i) relative time

(ii) Absolute c

Author proposes (i) absolute time

(ii) relative c

4 shows equivalence – Also differences

Remarks on above by Weizsaecker p. 141

Adot: Compton Chart on Elec. mag Radiations $10.00

W. M. Welch. Sc. Co

1515 Sedgwick St, Chicago

Illinois USA

Zs. f. Ap. 18 Bd. 1 Heft, p. 1. A. Corlin – Building up of larger bodies from small particles in interstellar space

---

ie for all odd composites having 3 or 5 as a factor.

ie not valid for 9, 15, 21, 25, 27, 33, 35, 39, 45, 49, 51, 55, 57

ie valid only for odd composites having prime factors other than 3 & 5.

Of these cases of $n = 5$, $n = 7$ (omit), which are associated?

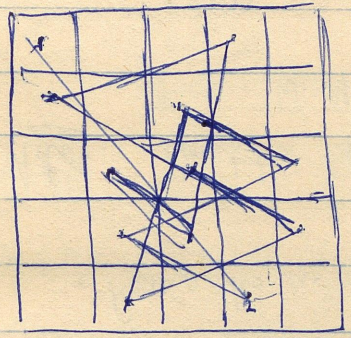
$a + a' = 2$
$b + b' = 0$

$(2, -1)$, $(1, 2)$.

Math $\begin{pmatrix} a & 2-a \\ b & -b \end{pmatrix}$ $\quad ab - (1-a)b = b(2a-1)$

$a \neq 2$

$\begin{pmatrix} 1 & 1 \\ 2 & -2 \end{pmatrix}$



$(-2, 1)$, & $(-1, 2$

Malhari Rao again (Vide p. 118).

(1) Suppose poms of 25 & 1 are in complementary cells

[Recall moves can be $(\pm 1, \pm 2)$, $(\pm 1, 0)$, $(0, \pm 1)$, $(\pm 2, \pm 1)$, $(\pm 2, 0)$, $(0, \pm 2)$, $(\pm 2, \pm 2)$. for any two poms of 25 & 1]

~~$i + ax + a'y =$~~ say $(i, j) = (2, 1)$

$25 = (4, 4)$ is in $(2, 3)$.

~~$2 + ax + a'y$~~

$2 + 4(a + a') = 2$ $\quad a + a' =$ $\quad (x, y) = (3, 1)$ ie 9

$1 + 4(b + b') = 2$

$1 - 8 = 1 + 1 = 2$

$2 + 3a + a' = \alpha$

$1 + 3b + b' = \beta$

~~$3 + (a' + b') = \alpha + \beta$~~

$2 + 4(a' + a') = 2$

$1 + 4(b + b') = 1 - 8 = -7 = 3$

$b + b' = -2$

$b' = -2 - b$

$2 + 2a = \alpha$

$1 + 3b - 2 - b = \beta$

$2 + 2a = \alpha$

$-1 + 2b = \beta$

J. App. Phys Feb. 39, p. 108. – A fine song (physical) of the Cavendish Society, Cambridge.

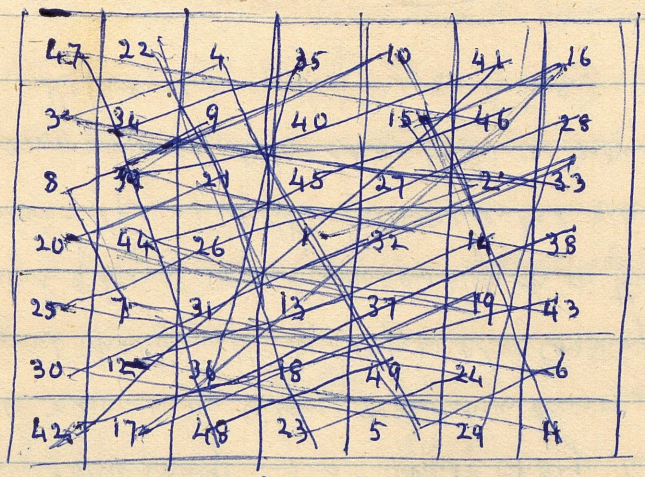
Chorus: Oh my darlings! Oh my darlys
oh my darling ions mine!

J. Chem. Phys. Feb. 39
p. 103. Guggenheim – "Thermodynamics probabilities"
Menhas Fowler R.H

Physica Feb. 39
p. 115. H.J. Groenewold – A classical point charge

Intr: Point charge → ∞. Finite charge to rel. non-invariance & a non-e.m. energy-momentum tensor. This note maintains a point charge with modified electromag field. A fundamental interval of time is introduced which is the counterpart in Coord-Space of the fundamental mass in the Yukawa-Proca interaction field in momentum space.
Reference to work of Pryce & others

$n=7$



47	22	4	35	10	41	16
3	34	9	40	15	46	28
8	39	21	45	27	2	33
20	44	26	1	32	14	38
25	7	31	13	37	19	43
30	12	36	18	49	24	6
42	17	48	23	5	29	11

also nasik.

$n = 7$

$(2,1), (-1,2)$

giving nasik

take $(i,j) = (3,3)$

at centre.

(not an elegant four either).

$x+8=c$, $c=8,9,10,11,\ldots 16$
$0,0,1,2,\ldots 7$ $\quad 16-7=9.$

take $\begin{pmatrix} 2, & -1 \\ 1, & -3 \end{pmatrix}$ $\boxed{\begin{pmatrix} 1, & 1 \\ -2, & 3 \end{pmatrix}}$

$\left.\begin{array}{l} i+2x-y=4 \\ j+x-3y=4 \end{array}\right\}$ $\quad 8-21$
$j=17.$

l.d is $3x-4y=d$

u.d is $x+2y=c$, $c=0,\ldots 8$

$3x-16=d$, $d=-16,-13,-10,-7,-4,-1$
$\equiv 2,5,8,2,5,8,2,5,$

$d=(2,5,8)$, $c=(0,1\ldots 8)$

Take one case $c=24$, $d=5$.

$\left.\begin{array}{l} 3x-4y=5 \\ x+2y=4 \end{array}\right\}$ $\quad 5x=13=4$
$x=8,\ y=7.$

$(x,y)=(8,7)$

~~$(i,j)=(4,8)$~~

$(i,j)=(4,8)$

$n=9$

fails in ~~two~~ some rows, but magic in cols. & diagonals

13	28	52	67	1	25	40	55	79
51	66	9	24	39	63	78	12	36
8	23	38	62	77	11	35	50	65
37	61	76	10	34	49	64	7	22
75	18	33	48	72	6	21	45	60
32	47	71	5	20	44	59	74	17
70	4	19	43	58	73	16	31	46
27	42	57	81	15	30	54	69	3
56	80	14	29	53	68	2	26	41

none possible for n, since we have here $a' = -3$. not prime to n

none of the cases where R.M & B.M's are K.M's leads to magic squares for $n=9$ also. Sum for $n=15$ etc.

Phys. Rev (1/2/39) p. 263 – Ind. determination of binding energy of deuteron by F. T. Rogers & M. M. Rogers

p. 277. Rose & Bethe – Absence of polarisation in electron scattering

p. 312. Kennard – Shape of domains in ferromagnetics

p. 315. Letter on interchange energy of two free electrons (Elementary Quantum mech) C. A. Ludeke (Student of Podolsky)

ibid (15/2/39) p. 361 – L. Spitzer: General soln for eqns of natural line breadth
Reference to Wyner-Weisskopf – Titchmarsh Fourier Int

p. 364 Tolman: Soln of Einstein's field eqns for spheres of fluid
Imp || (undertaken at request of Oppenheimer)

p. 374. J. R. Oppenheimer & Volkoff – on massive neutron
Imp || Cores – Appln of above to stellar structure

$n = 15$. All the 16 cases appear taboo since $(ab' - a'b) = \pm 3$, or ± 5.

Quite a remarkable result that a square of the 15th order cannot be covered completely by continuous Knight's moves. just like $n = 8$.

Of course this result is true only for the case where the method of R.M's & B.M's are used; We have not shown that there are do not other irregular methods (for eg. changing K.M's at each step arbitrarily) will not lead to Knight's tours for $n = 15$.

An example each for $n = 5, 7, 9$ of the Knight's tour & the associated tour diagrams.

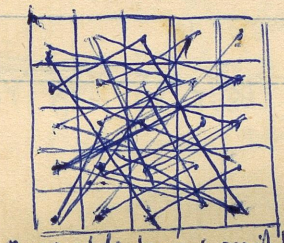
11	3	20	7	24
19	6	23	15	2
22	14	1	18	10
5	17	9	21	13
8	25	12	4	16

R.M (2,1); B.M (1,2), (i,j) = (0,0)

18	10	22	14	1
21	13	5	17	9
4	16	8	25	12
7	24	11	3	20
15	2	19	6	23

missable tour

~~(2,-1) (-1,-2) i,j = (0,0)~~
(2,1), (1,2), (i,j) = (4,4)



missable tour

missable tour (omit this).

p. 413. Letter by Volkoff on same topic

p. 416-419. Letters on fission of Uranium nucleus - Specially the interesting letter by N. Bohr on p. 418 - promises a detailed paper in collaboration with Prof J. A. Wheeler.

Nuovo Cimento A. 15. N. 8, p. 482 - A. Ciccone - Large article on infra Red & Raman spectra

J. Sc. Instr. Feb 39

p. 37. Article by J. D. Cockcroft - on the Cyclotron and its applications

Exh | p. 52. "Roberval Enigma" exhibit - linkages & mechanical weighing

25/3/39: Advt:

BK || L. Brillouin: Les tenseurs en Mécanique et en élasticité 120 fr.
Masson et Cie, Editeurs,

$\begin{pmatrix}2,-3\\1,1\end{pmatrix}, \begin{pmatrix}-1,3\\2,-1\end{pmatrix}$ give nasik squares

$\begin{pmatrix}-2,3\\1,1\end{pmatrix}, \begin{pmatrix}1,-3\\2,-1\end{pmatrix}$ give nasik square

$\begin{pmatrix}2,-1\\1,-3\end{pmatrix}, \begin{pmatrix}1,1\\-2,3\end{pmatrix}$ nasik, $\begin{pmatrix}2,-3\\1,-3\end{pmatrix}, \begin{pmatrix}-1,3\\-2,3\end{pmatrix}$ 7 cases.

[In the 8 working cases of $n=5$ similarly $n=7 \to 7$ cases of (i,j)
in the other 8 forbidden " get nasiks for all (i,j)

So out of the 16 cases, 8 give 7 values of (i,j) & the other 8 nasik squares whatever (i,j) - Same true of $n=11$ & 13.

$\underline{n=9}$. $\begin{pmatrix}2,-1\\1,1\end{pmatrix}, \begin{pmatrix}1,1\\2,-1\end{pmatrix}$ Here $ab'-a'b = \pm 3$ & so no square possible

$\begin{pmatrix}2,-3\\1,1\end{pmatrix}, \begin{pmatrix}-1,3\\2,-1\end{pmatrix}$ are possible [Later these are also not possible since $\underline{a'}=-3$ is not prime to 9.

ie we have 8 cases being exactly those not valid for $n=5$; those valid for $n=5$ are not valid for $n=9$.

For $n=9$ also no Knights tour possible

$\begin{pmatrix}2,-3\\1,1\end{pmatrix}, \begin{pmatrix}-1,3\\2,-1\end{pmatrix}$

(a) $\left\{\begin{array}{l} u.d \text{ is } x-4y=c \\ l.d \text{ is } 3x-2y=d \end{array}\right.$ $\left|\begin{array}{l} u.d \text{ is } -3x+4y=c \\ l.d \text{ is } x+2y=d \end{array}\right\}$ (b)

(a) $4-4y=c$, $c=4,0,-4,-8,-12,-16,-20,-24,-28 \equiv 4,0,5,1,6,2,7,3,8$
$x-16=c$, $c=$ ~~-16,-12,-10,-8,-2~~, $-16,-15,\ldots-8 \equiv 2,3,4,5,6,7,8,0,1$ $\Big\}$ $c=0,-8$

$12-2y=d$, $d=12,10,8,6,4,2,0,-2,-4 \equiv 3,1,8,6,4,2,0,7,5$

$3x-8=d$, $d=-8,-5,-2,1,4,7,10,13,16 \equiv 1,4,7,1,4,7,1,4,7$. $d=1,4,7$.

ie there altogether 27 possible (i,j)

Same is true of (b). Obviously true of all the 8 possible cases. ?

all wrong

$2y=5$

Suppose $c=1, d=1$, $x-4y=1$, $3x-2y=1$, $5x=1$, $x=2$, $y=7$.
$c=4, d=4$, $x-4y=4$, $3x-2y=4$, $5x=4$, $x=8$, $y=1$ ✓
$c=7, d=7$, $x-4y=7$, $3x-2y=7$ $5x=7$, $x=5$, $y=4$ ✓

$2y=-7$

$c=3, d=4$, $x-4y=3$, $3x-2y=4$, $5x=5$, $x=1$, $y=4$ ✓
$c=7, d=4$, $x-4y=7$, $3x-2y=4$, $5x=1$, $x=2$, $y=1$ ✓
$c=5, d=7$, $x-4y=5$, $3x-2y=7$, $5x=9$, $x=0$, $y=1$ ✓

ie the 27 values are given by (x,y), $=(0,1), \ldots (8,1)$
$(0,4), \ldots (8,4)$
$(0,7), \ldots (8,7)$

For (b), $c=3$ values in $1,4,7$.
$-3x+16=c$, $c=16,13,10,7,4,1,\ldots$
$=7,4,1,7,4,1,7,4,1$
$d=9$ values. Same as (a).

120, Boulevard Saint-Germain - Paris

Ann. de Physique t. 11, Feb. 39, p. 256

L. Brillouin - La méc. und.

Bk || des systèmes de Corpuscles (Review of de Broglie's book)

(Gauthier Villars)

Collection de phys. math, Borel - Brill, fasc V

Proc. Nat. Acad. Sc. Vol 25. No. 2 (15/2/39)

p. 104. Kasner & J de Cicco - curv. elements

Proc. Imp. Acad. Jan 39

p. 1. S. Iyanaga - Inv. of Betti's group.

Wetenschappen Vol. 42. No. 2

p. 147. J. Teghem - Dioph. inequalities

---

p. 158. P. G. Molenaar - ~~Cub~~ binary cubic forms

Naturwiss. 27 J. (24/2/39)

p. 132. Letter by P. Weisz on Mesotron and direction - distribution of cosmic rays

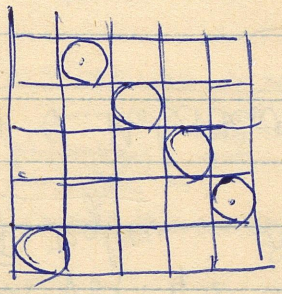
Ref. to Eulr. Heisenberg (Erg - Exact. Naturw. 17, 1 (1938)

$(x,y) = (2,0), \ldots (2,4)$

$\begin{pmatrix} -2, & 1 \\ -1, & -1 \end{pmatrix}, \begin{pmatrix} -1, & -1 \\ -2, & 1 \end{pmatrix}$ $\quad \begin{array}{l|l} i - 2x + y = 2 & i - x - y = 2 \\ j - x - y = 2 & j - 2x + y = 2 \end{array} \quad i \rightleftarrows j$

$(i,j) = (6,4), (5,5), (4,6), (3,7), (2,8) \equiv (1,4), (0,0), (4,1), (3,2), (2,3)$

$(i,j) = (4,6), (5,5), (6,4), (7,3), (8,2) \equiv (4,1), (0,0), (1,4), (2,3), (3,2)$



same in both cases.

$(-2,-1) \triangleleft (-1,-2)$

$(-1,-2) \triangleleft (-2,-1)$.

$(4,1), (1,4)$ give associated squares

25/3/39: Sir C.V. said that Prof. Born was elected an F.R.S. Write a letter of congratulations.

For $n = 7$: In this case all the 16 cases hold

Consider two cases

$\begin{pmatrix} 2, & -1 \\ 1, & 1 \end{pmatrix}, \begin{pmatrix} 1 & 1 \\ 2, & -1 \end{pmatrix}$ $\quad$ l.d is $x = c$, u.d is $x - 2y = d$, and $-x + 2y = d$. $c = 3$

$(x,y) = (3,0), \ldots (3,6)$.

$\begin{array}{l|l} i + 2x - y = 3 & i + x + y = 3 \\ j + x + y = 3 & j + 2x - y = 3 \end{array} \quad$ if $i \rightleftarrows j$

$(i,j) = (-3,0), (-2,-1), (-1,-2), (0,-3), (1,-4), (2,-5), (3,-6), (4,-7)$

$\equiv (4,0), (5,6), (6,5), (0,4), (1,3), (2,2), (3,1)$

same (i,j) for the other case also. Common for both 7 cases.

(proper name)

p. 133. C. F. v. Weizsäcker – Zum Wefelmeierschen Modell der Transurane.

(Ref. to Bethe-Bacher. § 30).

p. 135. Review of Brillouin's book on tensors by Max Kohler.

p. 134. Letter on Hahn & Strassmann's work by W. Jentscke & F. Prankl.

p. 136. Review of Rachevsky's book by W. Ludwig

ibid (3/3/39)

J. Frank. Inst: Feb. 39.

p. 293. Review of Smart's book by R. H. Oppermann

Ref. to Books p. 295

Bk || Quelques questions de Mecanique et de Physique Math. by V. Volterra, 82 pp. Gauthier-Villars (1938) 40 fr.

Comptes Rendus t. 203, No. 7 (13/2/39)

p. 497. Géhénian: Photon. theory

---

ibid No. 8 (20/2/39)

p. 558 – on 3-body problem.

p. 570 – Letter by J. Solomon on recent dissociation of Uranium nucleus by neutrons

$\begin{pmatrix} 2 & -3 \\ -1 & 3 \end{pmatrix}, \begin{pmatrix} -1 & 3 \\ 2 & -3 \end{pmatrix}$ $(x,y) = (2,0), \dots (2,4)$

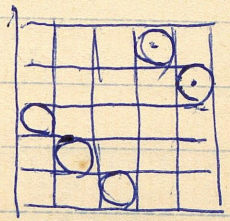
$(i,j) = (-2,4), (1,1), (4,-2), (7,-5), (10,-8)$

$i + 2x - 3y = 2$ | $i - x + 3y = 2$
$j - x + 3y = 2$ | $j + 2x - 3y = 2$

$\equiv (3,4), (1,1), (4,3), (2,0), (0,2)$

same in both cases. $(4,3) \triangle (3,4)$ give associated squares

both cases



$(2,-1) \triangle (-1,2)$; $(-1,2) \triangle (2,-1)$

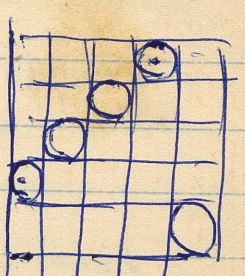
$\begin{pmatrix} 2 & -1 \\ -1 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 1 \\ -2 & 1 \end{pmatrix}$ $x = (2,0), \dots (2,4)$. $i + 2x - y = 2$ | $i + x + y = 2$
$j - x - y = 2$ | $j - 2x + y = 2$

$(i,j) = (-2,4), (-1,5), (0,6), (1,7), (2,8) \equiv (3,4), (4,0), (0,1), (1,2), (2,3)$

$(i,j) = (0,6), (-1,5), (-2,4), (-3,3), (-4,2) \equiv (0,1), (4,0), (3,4), (2,3), (1,2)$ | same

F. W. Dawson
462, East Tenth Ave,
Skate Valley Pa.

both cases



$(2,-1) \triangle (1,-2)$; $(1,-2) \triangle (2,-1)$

$(0,1) \triangle (3,4)$ give associated squares

Club

$\begin{pmatrix} -2 & 3 \\ -1 & 3 \end{pmatrix}, \begin{pmatrix} 1 & -3 \\ 2 & -3 \end{pmatrix}$ $(x,y) = (2,0), \dots (2,4)$

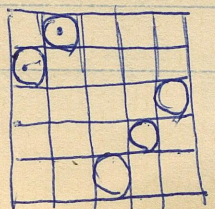
$i - 2x + 3y = 2$ | $i + x - 3y = 2$
$j - x + 3y = 2$ | $j + 2x - 3y = 2$

$(i,j) = (6,4), (3,1), (0,-2), (-3,-5), (-6,-8)$
$\equiv (1,4), (3,1), (0,3), (2,0), (4,2)$

$(i,j) = (0,-2), (3,1), (6,4), (9,7), (12,10)$
$\equiv (0,3), (3,1), (1,4), (4,2), (2,0)$ | same

$(0,3) \triangle (1,4)$ give associated squares

both cases



$(-2,-1) \triangle (1,2)$; $(1,2) \triangle (-2,-1)$.

Amer. Math. Monthly : Nov. 1937

p. 559. Fashions in Mathematics - by D. R. Curtiss

p. 591. Review of Hogben's book "Math for the 10^6" by R. Beatley.

ibid : Dec, 1937, p. 649 - Review of Dandekar's book

p. 658 - Junior Mathematics Club, Univ. of Wisconsin Extension Division

Encls || President: H. Hibscher.

Faculty Advisor: Dr. Louise A. Wolf -

A motion picture on Geometry & one on the solar system were shown - Exhibits included historical devises for noting passage of time, Calc. machines, astr. models, slide rules, strings, plaster, wood models; Charts, drawings.

ibid : Jan 1938,

p. 43. Review of Bell's Men of Mathematics

p. 44. Books for Clubs.

BK || "Brush up your wits" by H. Phillips (Caliban) London, Dent, 1936, 116 pgs

BK || Caliban's problem Bk: London, de la Rue, 1933 330 pp.

$\begin{pmatrix} 2, & -3 \\ 1, & -3 \end{pmatrix}, \begin{pmatrix} -1, & 3 \\ -2, & 3 \end{pmatrix}$ u.d is $x = c$ | $x = c$

l.d is $3x - 6y = d$ or $x - 2y = d$, | $-3x + 6y = d$, $-x + 2y = d$

$3x - 6y = d$, $6 - 6y = d$, $d = 6, 0, -6, -12, -18 \equiv (1, 0, 4, 3, 2)$

or $x - 2y = d$, $\rightarrow d = 0, 1, 2, 7, 4$.

$(x, y) = (2, 0), (2, 1) \ldots (2, 4)$

$i + 2x - 3y = 2$

$j + x - 3y = 2$

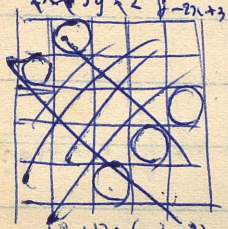
$(i, j) = (-2, 0), (1, 3), (4, 6), (7, 9), (10, 12) \equiv (3, 0), (1, 3), (4, 1), (2, 4), (0, 2)$

$i - x + 3y = 2$ | $i - x + 3y = 2$

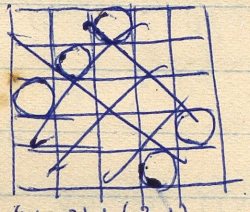
$j - 2x + 3y = 2$ | $j - 2x + 3y = 2$

$(i, j) = \cancel{(2, 3), (3, 1), (1, 4), (4, 2), (2, 0)}. = (4, 6), (1, 3), (-2, 0), (-5, -3), (-8, -6)$

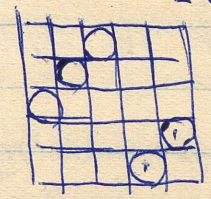
$\equiv (4, 1), (1, 3), (3, 0), (0, 2), (2, 4)$



$(2, 1)$ & $(-1, -2)$



$(-1, -2)$ & $(2, 1)$



Same in both cases

$(2, 1)$ & $(-1, -2)$

$(-1, -2)$ & $(2, 1)$.

$(4, 1)$ gives associated square

& $(3, 0)$ $(x, y) = (2, 2)$

$\begin{pmatrix} -2, & 1 \\ 1, & 1 \end{pmatrix}, \begin{pmatrix} -1, & -1 \\ 2, & -1 \end{pmatrix}$ $(x, y) = (2, 0) \ldots (2, 4)$ both cases.

$i = (1 - a - a')2 \rightarrow (i, j) = (4, 6)$

$j = (1 - b - b')2 \rightarrow$ $= (4, 1)$ associated $(x, y) = 2, 2$.

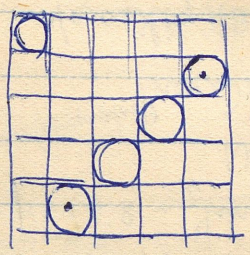
$i - 2x + y = 2$ | $i - x - y = 2$

$j + x + y = 2$ | $j + 2x - y = 2$

$(i, j) = (6, 0), (5, -1), (4, -2), (3, -3), (2, -4) \equiv (1, 0), (0, 4), (4, 3), (3, 2), (2, 1)$

$(i, j) = (4, -2), (5, -1), (6, 0), (7, 1), (8, 2) \equiv (4, 3), (0, 4), (1, 0), (2, 1), (3, 2)$

$(4, 3)$ & $(1, 0)$ give associated squares.



both cases.

$(-2, 1)$ & $(-1, 2)$; $(-1, 2)$ & $(-2, 1)$.

$(x, y) = (2, 0), \ldots (2, 4)$

$\begin{pmatrix} -2, & 3 \\ 1, & -3 \end{pmatrix}, \begin{pmatrix} 1, & -3 \\ -2, & 3 \end{pmatrix}$

$i - 2x + 3y = 2$ | $i + x - 3y = 2$

$j + x - 3y = 2$ | $j - 2x + 3y = 2$

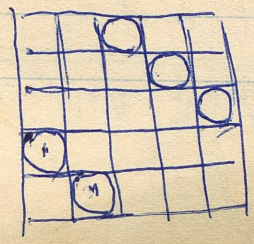
$(i, j) = (6, 0), (3, 3), (0, 6), (-3, 9), (-6, 12)$

$\equiv (1, 0), (3, 3), (0, 1), (2, 4), (4, 2)$

$(i, j) = (0, 6), (3, 3), (6, 0), (9, -3), (12, -6)$

$\equiv (0, 1), (3, 3), (1, 0), (4, 2), (2, 4)$

same set both cases



both cases

$(0, 1)$ & $(1, 0)$ give associated squares.

$(-2, 1)$ & $(1, -2)$; $(1, -2)$ & $(-2, 1)$.

Bk
(a) Amusements in Math.
(b) The Canterbury Puzzles & Other Curious Problems
(c) Puzzles & Curious Problems
by H. E. Dudeney.

p. 45. Club. Reports.

Dr. D. A. Flanders "on the pathology of Geometry"
Math. Phys club, College of St. Teresa -
A math. play "The naughty little three". -
Geometrical proof that there is a Santa Claus
" Constn of Christmas Star
Math. Christmas tree.

ibid: 7 Feb. 38. p. 68. "Stellated Polyhedra" illustrated by models" by A. H. Wheeler, North High School
Enh Worcester, Mass
Interesting Paper models - photographs of stellated polyhedra

---

p. 76. on the 3-body problem by H. E. Buchanan,
Tulane University

---

p. 88. Some elementary aspects of topology by W. L. Ayres
Univ. of Michigan

Now for the W.M:

$i = 4 - 2x + 2y$	$i = 4 + 2x - 2y$	$i = 4 + x - y$	$i = 4 - x + y$
$j = 4 - x - y$	$j = 4 - x - y$	$j = 4 + 2x - 4y$	$j = 4 + 2x - 4y$

Try $(x,y) = (4,4)$, $(i,j) = (4,-4), (4,-4), (4,-4), (4,-4) \equiv (4,5)$ usual case

So without further trouble we can conclude that ~~for~~ all the ~~m~~ 4 moves.

~~these are~~ give associated squares with $(x,y) = (4,4)$ ie 41 in the central cell

---

Both R.M's & B.M's being R.M's.

	$(1,2)$	$(-1,2)$	$(1,-2)$	$(-1,-2)$
$(2,1)$	✓	×	×	✓
$(-2,1)$	×	✓	✓	×
$2,-1$	×	✓	✓	×
$-2,-1$	✓	×	×	✓

$\begin{pmatrix} 2, & -3 \\ 1, & 1 \end{pmatrix}$ × $\begin{pmatrix} -1, & 3 \\ 2, & -1 \end{pmatrix}$ ×

$\begin{pmatrix} 2 & -1 \\ 1, & -3 \end{pmatrix}$ × $\begin{pmatrix} 1 & 1 \\ -2 & 3 \end{pmatrix}$ ×

$\begin{pmatrix} -2, & 3 \\ 1, & 1 \end{pmatrix}$ × $\begin{pmatrix} 1, & -3 \\ 2, & -1 \end{pmatrix}$ ×

$\begin{pmatrix} -2, & 1 \\ 1, & -3 \end{pmatrix}$ × $\begin{pmatrix} -1, & -1 \\ -2, & 3 \end{pmatrix}$ ×

$\begin{pmatrix} 2, & -1 \\ -1, & 3 \end{pmatrix}$ × $\begin{pmatrix} 1, & 1 \\ 2, & -3 \end{pmatrix}$ ×

$\begin{pmatrix} 2, & -3 \\ -1, & -1 \end{pmatrix}$ × $\begin{pmatrix} -1, & 3 \\ -2, & 1 \end{pmatrix}$ ×

$\begin{pmatrix} -2, & 1 \\ -1, & 3 \end{pmatrix}$ × $\begin{pmatrix} -1, & -1 \\ 2, & -3 \end{pmatrix}$ ×

$\begin{pmatrix} -2, & 3 \\ -1, & -1 \end{pmatrix}$ × $\begin{pmatrix} 1, & -3 \\ -2, & 1 \end{pmatrix}$ ×

$\begin{pmatrix} 2, & -1 \\ 1, & 1 \end{pmatrix}$ $\begin{pmatrix} 1, & 1 \\ 2, & -1 \end{pmatrix}$ In both cases l.d is $x = c$

u.d is $x - 2y = d$, $-x + 2y = d$

$2 - 2y = d$, $d = 2, 0, -2, -4, -6$
$\equiv 2, 0, 3, 1, 4$.

$x - 4 = d$, $d = -4, -3, -2, -1, 0$
$= 1, 2, 3, 4, 0$

$-4 + 2y = d$, $d = -4, -2, 0, 2, 4$
$= 1, 3, 0, 2, 4$

$-x + 4 = d$, $d = 4, 3, 2, 1, 0$.

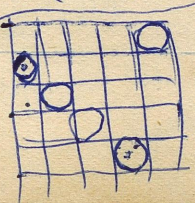
In both cases there are 5 values of d.

$c = 2$, $d = 0, 1, 2, 3, 4$.

$(x,y) = (2,0), (2,1), \ldots (2,4)$

$i + 2x - y = 2$
$j + x + y = 2$ | $(i,j) = (-2,0), (-1,-1), (0,-2), (1,-3), (2,-4) \equiv (3,0), (4,4), (0,3), (1,2), (2,1)$

$i + x + y = 2$
$j + 2x - y = 2$ | $(i,j) \rightleftarrows (0,3), (4,4), (3,0), (2,1), (1,2)$.



For both cases RM & BM being $(2,1), (1,2)$ & $(1,2), (2,1)$

For associated sq $i = (1 - a - a')2 = 0$ ie $(i,j) = (0,3)$ gives associated square.
$j = (1 - b - b')2 = -2$

$(3,0)$ & $(0,3)$ // give associated squares /

$(x,y) = (2,2)$ //

Refers to the Königsberg 7 Bridges problem, Knight move problem, Hamilton's dodecahedron problem, Four color-problem; Water, Gas & Elec. problem & Kuratowski's theorem, Refers to Wilder's article

---

p. 93. Math. adventures in social science by H. T. Davis; Northwestern Univ.

---

ibid: ~~April~~ March 38.

p 147. Mention of Lill process (Nouv. Ann. de Math, 1867, p. 359, 1868, p. 363) of associating

Exh || an "orthogon" with a polynomial – soln of eqns

~~p. 165~~.

---

p. 165. Matrix approx. & latent roots by A. S. Householder & Gale Young – Univ. of Chicago. Problem arising in psychology

---

Bk || The Axiomatic Method in Biology by J. H. Woodger New York, Macmillan, 1937, $3.75

$\cancel{-12+35}$ $\cancel{23}$ 8

$x - 3y = 1, 4, 7.$ $\quad -21+5=-16$ $\quad \cancel{-28=-17}$

$-3x + 5y = 2, 5, 8.$ $\quad -12+35$ 23 $\quad \cancel{-21+20}$ $-21+35$

$x-3y=1$, $-3x+5y=2.$	$-4y=5,\ y=1,\ x=4$ ✓	$x-3y=4$, $-3x+5y=2$	$-4y=14,\ y=1,\ x=7$ ✓
$x-3y=1$, $-3x+5y=5$	$-4y=8,\ y=7,\ x=22\equiv 4$ ✓	$x-3y=4$, $-3x+5y=5$	$-4y=17,\ y=7,\ x=7$ ✓
$x-3y=1$, $-3x+5y=8$	$-4y=11,\ y=4,\ x=4.$	$x-3y=4$, $-3x+5y=8$	$-4y=20,\ y=4,\ x=7$ ✓

$x-3y=7$, $-3x+5y=2$	$-4y=23,\ y=1,\ x=1$ ✓
$x-3y=7$, $-3x+5y=5$	$-4y=26,\ y=7,\ x=1$ ✓
$x-3y=7$, $-3x+5y=8$	$-4y=29,\ y=4,\ x=1$

$(x,y) = (1,1), (1,4), (1,7)$
$(4,1), (4,4), (4,7)$
$(7,1), (7,4), (7,7)$

use this both for D.M & W.M hoping it is correct //

Table. ~~D.M~~ D.M first $i = 4 - ax - a'y,\ j = 4 - bx - b'y.$

$i = 4 - 2x + 2y,$	$i = 4 \overset{+2x-2y}{\cancel{+x+y}}$	$i = 4 \overset{-x+y}{\cancel{+x-y}}$	$i = 4 + x - y$
$j = 4 + x + y$	$j = 4 + x + y$	$j = 4 - 2x + 4y$	$j = 4 - 2x + 4y.$

$(x,y) = (1,1),\ (i,j) = (4,6), (4,6), (4,6), (4,6).$

$(x,y) = (1,4), (i,j) = \cancel{(10,9), (-2,9), (7,18), (1,18) = (1,0), (7,0),}$
$= (10,9), (-2,9), (7,18), (1,18) = (1,0), (7,0), (1,0), (1,0).$ (!)

$(x,y) = (1,7), (i,j) = (16,12), (-8,12), (10,30), (-2,30) \equiv (7,3), (1,3), (1,3), (7,3)$ (!)

$(x,y) = (4,1), (i,j) = (-2,9), (10,9), (1,0), (7,0) \equiv (7,0), (1,0), (1,0), (7,0)$!

$(x,y) = (4,4), (i,j) = (4,12), (4,12), (4,12), (4,12) \equiv (4,3)$ usual D.M ie associated ✓

$(x,y) = (4,7), (i,j) = (10,15), (-2,15), (7,24), (1,24) \equiv (1,6), (7,6), (7,6), (1,6)$

$(x,y) = (7,1), (i,j) = (-8,12), (16,12), (-2,-6), (10,-6) \equiv (1,3), (7,3), (7,3), (1,3).$

$(x,y) = (7,2), (i,j) = (-6,13), (14,13), (-1,-2), (9,-2) \equiv (3,4), (5,4), (8,6), (0,7).$

$(x,y) = (7,7), (i,j) = (4,18), (4,18), (4,18), (4,18) \equiv (4,0), (4,0), (4,0), (4,0).$

only $(x,y) = (4,4)$ gives $(i,j) = (4,3)$ associated case for all 4 moves:

Books for Clubs.

Bk — Special topics in Theoretical Arithmetic by J. Bowden
Garden City, New York, $2.50

Bk — A Mathematician explains – by Mayme I. Logsdon,
Chicago, Univ. of Chicago Press, $2.00

Ibid: April 38, p. 234, Lewis Carroll & a geometrical paradox, by Warren Weaver, Rockfeller foundation

Books for Clubs:

(1) The frozen fountain by Claude F. Bragdon, New York
Knopf, 1932, $3.75
Art of design in space & architecture

Bk. Enh

(2) A primer of higher space by do .. $2.00 – use of projections of 4-dim. reg. solids in architectural designs

(3) The New Image by do $3.00.

(4) Brain Teasers by Philip J. Rulon, Boston, D.C. Page & Co, 1932, $1.50

Bk Enh

(5) Puzzles in Wood by Edwin M. Wyatt Milwaukee,
Bruce Publ Co, 1928, $0.75
Puzzles out of wood.

It would be a terrible job to find (i,j) for all the $(36+36)$ cases of the D.M & W.M. But we can test for associatedness using

$$i = (1-a-a')4, \quad j = (1-b-b')4.$$

D.D.M: cases are $\begin{pmatrix} 2, & -2 \\ 1, & -2 \end{pmatrix}, \begin{pmatrix} 1, & -1 \\ -2, & 1 \end{pmatrix}, \begin{pmatrix} -1, & 1 \\ -2, & 1 \end{pmatrix}, \begin{pmatrix} -2, & 2 \\ 1, & -2 \end{pmatrix}$

D.M cases are $\begin{pmatrix} 2, & -2 \\ -1, & -1 \end{pmatrix}, \begin{pmatrix} -2, & 2 \\ -1, & -1 \end{pmatrix}, \begin{pmatrix} 1, & -1 \\ 2, & -4 \end{pmatrix}, \begin{pmatrix} -1, & 1 \\ 2, & -4 \end{pmatrix}$

W.M cases are $\begin{pmatrix} 2, & -2 \\ 1, & 1 \end{pmatrix}, \begin{pmatrix} -2, & 2 \\ 1, & 1 \end{pmatrix}, \begin{pmatrix} -1, & 1 \\ -2, & 4 \end{pmatrix} \begin{pmatrix} 1, & -1 \\ -2, & 4 \end{pmatrix}$

D.D.M $(i,j) = (4,8), (4,8), (4,8), (4,8)$ but $(4,8)$ ~~is one of the (i,j)'s on p.~~

is one of the (i,j) for $\begin{pmatrix} 1, & -1 \\ -2, & 1 \end{pmatrix}$ and $\begin{pmatrix} -1, & 1 \\ -2, & 1 \end{pmatrix}$ ie out of the 16 (i,j) two give associated squares.

D.M $(i,j) = (4,12), (4,12), (4,12), (4,12)$ ie $(4,3)$ ie the usual position below the central cell.

W.M $(i,j) = (4,-4), (4,-4), (4,-4), (4,-4)$ ie $(4,5)$ ie " above "

but we have not found the (i,j)'s for the 36 cases of the D.M & 36 cases of the W.M to be able to check which give the associated squares.

Looking at the result on p. 125, we are perhaps justified in taking in all these 72 cases

$$\left.\begin{array}{l} (x,y) = (1,1), (1,4), (1,7) \\ \quad\quad (4,1), (4,4), (4,7) \\ \quad\quad (7,1), (7,4), (7,7) \end{array}\right\}$$ and then taking the several a, a', b, b' get the (i,j).

Before doing this check up by working one case of W.M. exhaustively

say $\begin{pmatrix} -1, & 1 \\ -2, & 4 \end{pmatrix}$ i.e. d is $x - 3y = c \rightarrow c = 1, 4, 7.$

$-3x + 5y = d \rightarrow -12 + 5y = d \rightarrow d = -12, -7, -2, 3, 8, 13, 18, 23, 28$
$= 6, 2, 7, 3, 8, 4, 0, 5, 1.$

$-3x + 20 = d \rightarrow 20, 17, 14, 11, 8, 5, 2, -1, -3$
$2, 8, 5, 2, 8, 5, 2, 8, 5$

Ibid : May 1938, p. 310. Comptes Rendus du Deuxième Congrès Int. de Récreation Math., Brussels, Librairie du "Sphinx", 5 f, 2 belga, 1 belga

p. 315. Review of Mahajani's books

Bk || Proj. ornament by Claude Bragdon, New York, Knopf, 1915, $2.

(4 drawings)

Bk || A romance of many dimensions by A. Abbott, Boston, Little, Brown, 1927, $1.50.

Bk || Poetry & Math. by S. M. Buchanan, New York, The John Day Co, 1929, $2.50

Bk || a) Non-Euclidean geometry
Esh || b) Galois & Theory of Groups
c) The Einstein Theory of Relativity Pt I

Part I by H. G. & L. R. Leiber, 228. Clinton Avenue, Brooklyn, New York, $1.00

Very brief, amusingly illustrated

Western ($n=9$)

Table here also for $n=9$ only 4 cases. $\begin{pmatrix}2,-2\\1,1\end{pmatrix}$ $\cancel{\begin{pmatrix}2,-2\\-1,1\end{pmatrix}}$ $\cancel{\begin{pmatrix}-2\\1\end{pmatrix}}$ $\begin{pmatrix}-2,2\\1,1\end{pmatrix}$, $\begin{pmatrix}-1,+1\\-2,4\end{pmatrix}$, $\begin{pmatrix}1,-1\\-2,4\end{pmatrix}$

Try the case $\begin{pmatrix}1,-1\\-2,4\end{pmatrix}$ $\left.\begin{array}{l}3x-5y=c.\\ \text{u.d is } \cancel{x=c=4}.\\ \text{l.d is } -x+3y=d\end{array}\right\} \to 9$ cases.

$\cancel{-4+3y=d,\ d=-4,-1,2,5,8,11,14,17,20}$
$\cancel{\equiv 5,8,2,5,8,2,5,8,2.}$

$\cancel{-x+12=d,\ d=12,11,10,9,8,7,6,5,4}$
$\cancel{\equiv 3,2,1,0,8,7,6,7,4}$ ie

~~$c=4,\ d=2,5,8$ 3 cases.~~

$\begin{pmatrix}-1 & 1\\-2 & 4\end{pmatrix}$ $\left.\begin{array}{l}-3x+5y=c\\ \text{l.d is } \cancel{x=c}\\ \text{u.d is } x-3y=d\end{array}\right\} \to 9$ cases.

$\begin{pmatrix}2,-2\\1,1\end{pmatrix}$ $\left.\begin{array}{l}\text{u.d is } x-3y=c\\ \text{l.d } 3x-y=d\end{array}\right\} \to 9$ cases

$\begin{pmatrix}-2,2\\1,1\end{pmatrix}$ $\left.\begin{array}{l}\text{u.d is } -3x+y=c\\ \text{l.d is } x+3y=d\end{array}\right\} \to 9$ cases.

In Islamic case we have consider only one ie $\begin{pmatrix}-2,2\\-1,-1\end{pmatrix}$ $\left.\begin{array}{l}\text{l.d is } -3x+y=c\\ \text{u.d } -x+3y=d\end{array}\right\} \to 9$ cases

$\begin{pmatrix}2,-2\\-1,-1\end{pmatrix}$ $\left.\begin{array}{l}\text{u.d } 3x-y=c\\ \text{l.d, } x-3y=d\end{array}\right\} \to 9$ cases

$\begin{pmatrix}1,-1\\2,-4\end{pmatrix}$ $\left.\begin{array}{l}\text{u.d is } -x+3y=c\\ \text{l.d is } 3x-5y=d\end{array}\right|$ $-4+3y=c,\ c=-4,-1,2,5,8,11,14,17,20$
$\equiv 5,8,2,5,8,2,5,8,2$
$-x+12=c,\ c=12,11,10$ - $c=2,5,8.$

$12-5y=d,\ d=12,7,2,-3,-8,-13,-18,-23,-28$
$\equiv 3,7,2,6,1,5,0,4,8$

$3x-20=d,\ d=-20,-17,-14,-11,-8,-5,-2,1,4$
$=7,1,4,7,1,4,7,1,4.$ $d=1,4,7.$

ie 9 cases

Similarly $\begin{pmatrix}-1,1\\2,-4\end{pmatrix} \to 9$ cases.//

p. 330. Notice about Princeton mimeographed notes. Inquiries and orders to be addressed to Princeton Math. Notes, Fine Hall, Princeton N.J

Ibid June-July 38 p. 385. Editor of Club section changed to E. H. C. Hildebrandt, New Jersey State Teachers College Upper Montclair, N.J.

Bk || Excursions in Math by Ernst R. ~~Bre~~ Breslich Chicago, The Orthovis Co, 1938, $1.20. — on problems of area & vol

---

Aug-Sept, 38 : p. 446. Math. Theory of big game hunting by H. Pétard, Princeton New Jersey

note

Enh || A most interesting parody on the most modern branches of Maths, Th. Phys & Emp. Phys — is worth a careful study

-2, -1
(123)

73	57	41	25	9	65	49	33	17
42	26	1	66	50	34	18	74	58
2	67	51	35	10	75	59	43	27
52	36	11	76	60	44	19	3	68
12	77	61	45	20	4	69	53	28
62	37	21	5	70	54	29	13	78
22	6	71	46	30	14	79	63	38
72	47	31	15	80	55	39	23	7
32	16	81	56	40	24	8	64	48

369

369

369

369

450 X

$(x,y)=(1,1)$ $\left.\begin{array}{l} i-2x+2y=4 \\ j-x-y=4 \end{array}\right\}$ $(i,j)=(4,6)$

64	48	32	16	81	56	40	24	8
33	17	73	57	41	25	9	65	49
74	58	42	26	1	66	50	34	18
43	27	2	67	51	35	10	75	59
3	68	52	36	11	76	60	44	19
53	28	12	77	61	45	20	4	69
13	78	62	37	21	5	70	54	29
63	38	22	6	71	46	30	14	79
23	7	72	47	31	15	80	55	39

369

369

369

369

Islamic only one can done ie $\begin{pmatrix} -2, & 2 \\ -1, & -1 \end{pmatrix}$

appears OK.

nine cases appear correct

p. 448 — Lecture on Function Concept by E. R. Heineck
— Good for refresher course

---

p. 455 — Subjects for Club Discussions.

---

p. 477. Ent || Using gear machines to demonstrate polar curves
— Prof. Raymond K. Morley, Worcester Polytech. Inst

BK || Intr. to Th. of Eqns by L. Weisner, Macmillan ($2.25) N.Y. 60-5th Ave, N.Y

Oct, 38, p. 500 — the p-adic numbers of Hensel by C. C. MacDuffee.

p. 511. Possible boundaries in the early History of Math. by D. E. Smith, Columbia Univ

on p. 514. Professor Smith says

« When we consider that the observation of the equinoxes and solstices as early as 3100 B.C. are recorded, and are vouched for by such scholars

~~(1,4), (7,4), (4,4)~~
~~(1,7), (7,7), (4,7)~~
~~(1,1), (7,1), (4,1).~~

$y = 1, 2, 4, 5, 7, 8.$

~~3y - x = 2~~, $x = 3y - 2,\ 3y - 5,\ 3y - 8.$

Also $3x = y - 1,\ y - 4,\ y - 7.$

~~(1,1), (-2,1), (-5,1).~~	~~(1,1), (7,1), (4,1)~~ ✓
~~(4,2), (1,2), (-2,2).~~	~~(4,2), (1,2), (7,2)~~ ✓
~~(10,4), (7,4), (4,4)~~	~~(1,4), (7,4), (4,4)~~
~~(13,5), (10,5), (7,5)~~	~~(4,5), (1,5), (7,5)~~
~~(19,7), (16,7), (13,7)~~	~~(1,7), (7,7), (4,7)~~
~~(22,8), (19,8), (16,8)~~	~~(4,8), (1,8), (7,8)~~

$-x + 3y = 2$, $-3x + y = 1$ | $8y = 5.\ y = 4,\ x = 1.$ $\overline{(1,4)}$ ✓

$-x + 3y = 5$, $-3x + y = 1$ | $8y = 14,\ y = 4,\ x = 1$ or 7 $(1,4)$ ✗, $(7,4)$ ✓

$-x + 3y = 8$, $-3x + y = 1$ | $8y = 23,\ y = 4,\ x = 1$ or 4, $(1,4)$ ✗, $(4,4)$ ✓

$-x + 3y = 2$, $-3x + y = 4$ | $8y = 2,\ y = 7,\ x = 1$ ~~or~~ $(1,7)$ ✓

$x = 19$, $-x + 3y = 5$, $-3x + y = 4$ | $8y = 11,\ y = 7,\ x = 1$ or 7 $(1,7)$ ✗, $(7,7)$ ✓

$x = 16$, $-x + 3y = 8$, $-3x + y = 4$ | $8y = 20,\ y = 7,\ x = 1$ or 4, $(1,7)$ ✗, $(4,7)$ ✓

$x -$, $-x + 3y = 2$, $-3x + y = 7$ | $8y = -1,\ y = 1,\ x = 7$ or 1 $(1,1)$ ✓, $(7,1)$ ✗

$-3x = 6$, $x = -2$, $-x + 3y = 5$, $-3x + y = 7$ | $8y = 8,\ y = 1,\ x = 7$ $(7,1)$ ✓

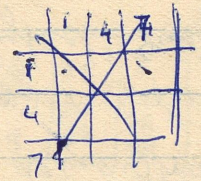
$-21 \equiv 6$, $-3x = -2$, $x = -2$, $-x + 3y = 8$, $-3x + y = 7$ | $8y = 17,\ y = 1,\ x = 7$ or 4 $(7,1)$ ✗, $(4,1)$ ✓

$x = -5$

$$\boxed{\begin{array}{l|l} i\ -2x + 2y = 4 & (i, \cancel{j}) = (2, 7) \\ j\ -x - y = 4. & \end{array}}$$

$8y = 14.$ ~~-x+12=11~~

(1,4), (7,4), (4,4)
(1,7), (4,7), (7,7)
~~(7,1), (7,7), (4,1)~~
(1,1), (4,1), (7,1)



(1,1), (1,4), (1,7)
(4,1), (4,4), (4,7)
(7,1), (7,4), (7,7)

we get 9 cases.

36×9
36
9 5
32 4
36 9

But we got 18 cases above which is correct?

Test (1,2)

obviously the 9 cases matter are correct.

as Sri Ramakrishna in his Cultural Heritage of India (Vol. 3, p. 344) we must . . . "

Write — The ignorance disclosed in this of India is phenomenal! This ought to be rectified. Prof. Smith ought to be written to

---

p. 576. Device for demonstrating properties of a simple permutation group by Vladimir Karapetoff, Prof. of Elec. Eng, Cornell Univ

Ent.

Suggests a device of using coloured electric bulbs with switches to permute colours or posn of lamps enabling a demonstrator before a large audience to visualise the fundamental properties of a group.

---

p. 522. An easy method for constructing polyhedral group-pictures by H.S.M. Coxeter, Univ. of Toronto —

Ent

Write to A.R.G. to look after models equipment if available.

---

p. 531. A programme for the Association by G.B. Price — Discussion good for Refresher Course — Specially references at end.

$\begin{pmatrix} 1, & -1 \\ -2, & 1 \end{pmatrix}$ $i + x - y = 4$ $(x,y) = (4,1), (4,4), (4,7)$
$j - 2x + y = 4$ $(i,j) = (1,11), (4,8), (7,5) \equiv (1,2), (4,8), (7,5)$

$\begin{pmatrix} -1, & 1 \\ -2, & 1 \end{pmatrix}$ $i - x + y = 4$ $(x,y) = (4,1), (4,4), (4,7)$.
$j - 2x + y = 4$ $(i,j) = (7,11), (4,8), (1,5) \equiv (7,2), (4,8), (1,5)$

Also $\begin{pmatrix} 1, & -1 \\ 2, & -3 \end{pmatrix}$ & $\begin{pmatrix} -1, & 1 \\ 2, & -3 \end{pmatrix}$ are out because $a' = -3$

In IDM. $(1,2), (1,5), (1,8)$

~~Islamic (n = 9)~~

	54	8		10	~~27~~	21	32	43
7	~~18~~	18	~~20~~	20	31	42		53
17	19	19	30	41		52	6	~~17~~
27	~~29~~	~~46~~		51	5	~~16~~	~~16~~	~~27~~
28 ~~39~~		~~50~~	4	~~15~~	15	~~26~~	26	~~38~~
49	3	~~14~~	14	~~25~~	25	36		38
~~13~~	13	~~24~~	24	35		37	48	2
~~23~~	23	~~34~~	45		47	1		12
33	44		46	9		11	~~22~~	22

$\begin{pmatrix} -1, & 1 \\ 2, & -3 \end{pmatrix}$ nasik for all (i,j)

$\begin{pmatrix} 1, & -1 \\ 2, & -3 \end{pmatrix}$ — do — not prime to 9

Islamic $(n = 9)$

$\begin{pmatrix} 2, & -2 \\ 1, & -3 \end{pmatrix}$ b' not prime to $n = 9$

$\begin{pmatrix} -2, & 2 \\ 1, & -3 \end{pmatrix}$ b' " 9.

~~$\begin{pmatrix} 2, & -2 \\ -1, & -1 \end{pmatrix}$ nasik.~~ $\begin{pmatrix} -2, & 2 \\ -1, & -1 \end{pmatrix}$ not nasik ✗ $\begin{pmatrix} 1, & -1 \\ 2, & -4 \end{pmatrix}$ not nasik ✓, $\begin{pmatrix} -1, & 1 \\ 2, & -4 \end{pmatrix}$ not nasik ✓,

$\begin{pmatrix} 2, & -2 \\ -1, & -1 \end{pmatrix}$ $\begin{pmatrix} -1, & 1 \\ -2, & 0 \end{pmatrix}$ X ; $\begin{pmatrix} 1, & -1 \\ -2, & 0 \end{pmatrix}$ X

$a - b = 3$, $a' + b' = -3$ not nasik

only 4 cases to consider

~~Between (n = 9) — also only 4 cases to be considered.~~

$\begin{pmatrix} -2, & 2 \\ -1, & -1 \end{pmatrix}$, u.d is $-x + 3y = c$, $-4 + 3y = c$, $c = -4, -1, 2, 5, 8, 11, 14, 17, 20 \equiv 5, 8, 2, 5, 8, 2, 5, 8, 2$.
l.d is $-3x + y = d$ $-x + 12 = c$, $c = 12, 11, 10, 9, 8, 7, 6, 5, 4 \equiv 3, 2, 1, 0, 8, 7, 6, 5, 4$
$(c = 2, 5, 8)$

$-3x + 4 = d$, $d = 4, 1, -2, -5, -8, -11, -14, -17, -20 \equiv 4, 1, 7, 4, 1, 7, 4, 1, 7$,
$-12 + y = d$, $d = -12, -11, \ldots = 0, 1, 2, \ldots 8$. $d = 1, 4, 7$.

$\begin{pmatrix} 2, & -2 \\ -1, & -1 \end{pmatrix}$

$\begin{pmatrix} 1, & -1 \\ 2, & -4 \end{pmatrix}$

$\begin{pmatrix} -1, & 1 \\ 2, & -4 \end{pmatrix}$

So there are 9 cases of (i,j). $x = 3y - (2, 5, 8)$

$-x + 3y = 2, 5, 8$
$-3x + y = 1, 4, 7$
$-3x + 9y = 6, 15, 24$

$8y = 5, 2, -1; 14, 11, 8; 23, 20, 17$.
$y = 4, 7, 1$; $5, 2, 8$, $5, 2, 8$

~~x = 10~~, $y = 4 \to x = 10, 7, 4 \equiv 1, 7, 4$; $y = 7 \to x = 19, 16, 13 \equiv 1, 7, 4$.
$y = 1 \to x = 1, -2, -5 \equiv 1, 7, 4$.

p. 548. Slides and films relating to Mathematics and its applns - Reference is made to a discussion on mathematical films at the annual meeting of the Brit Math. Assoc. Jan 3, 1936. See "Exhibition of math. films" Math. Gazette Vol. 20, 1936, pp. 110–14.

Exh

A list of films (1) Frequency curves - ½ reel (silent) (5), (8)

(2) Relat Einstein's Theory of Relativity - 2 reels silent (3), (8)

(3) Parabola 1 reel (Sound) - Rutherford Boys.

(4) The Development of Astr. Knowledge - 1 reel silent (8)

(5) The Evolution of the Universe - 1 reel silent (8)

(6) Gravitation &c, 1 reel silent (8)

(7) Sun " (8)

(8) Thro' the Kaleidoscope ¼ " (2) (7)

(9) Earth in motion 1 reel Sound (1) (4) (5) (6) (7) (8)

(10) Exploring Univ " " (4) (5) (8)

(11) Moon " " (1) (4) (5) (7) (8)

(12) Solar family " " (1) (4) (5) (6) (8)

(13) Play of magn in Gear " (5) (8)

(14) Sound waves " " (1) (4) (5) (6) (7) (8)

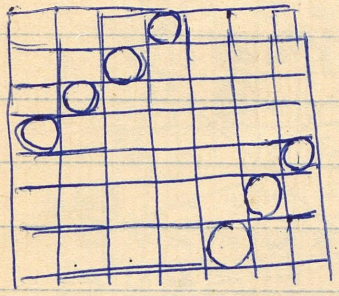
urnal I.D.M, I.M, W.M break moves with K.M's as R.M's for cases of $n = 7, 9, -$

~~(1) I.D.M~~ $n=7$ (i) I.D.M. $\begin{pmatrix} 2, & -2 \\ -1, & 0 \end{pmatrix} \times$, $\begin{pmatrix} -2, & 2 \\ -1, & 0 \end{pmatrix} \times$

$\begin{pmatrix} 2, & -2 \\ 1, & -2 \end{pmatrix}$ $\left.\begin{array}{l} i + 2x - 2y = 3 \\ j + x - 2y = 3 \end{array}\right\}$ $(x,y) = (3,0), (3,1), \ldots (3,6)$

$(i,j) = (-3,0), (-1,2), (1,4), (3,6), (5,8), (7,10), (9,12)$

$= (4,0), (6,2), (1,4), (3,6), (5,1), (0,3), (2,5)$



simplify equivalent

$\begin{pmatrix} 1, & -1 \\ 2, & -3 \end{pmatrix}$, $\begin{pmatrix} -1, & 1 \\ 2, & -3 \end{pmatrix}$ ~~leads to nasiks~~

leads to nasiks ($n=7$

I.D.M

$n=9$ cases to be discarded are same.

$\begin{pmatrix} 2, & -2 \\ 1, & -2 \end{pmatrix}$ u.d is $x = c = 4$

l.d is $3x - 4y = d$, $12 - 4y = d$, $\rightarrow d = 12, 8, 4, 0, -4, -8, -12, -16, -20, \cancel{-24}$

$= 3, 8, 4, 0, 5, 1, 6, 2, 7,$

ie $(4,0), (4,1), \ldots (4,8)$

$3x - 16 = d \rightarrow d = -16, -13, -10, -7, -4, -1, 2, 5, 8$

$= 2, 5, 8, 2, 5, 8, 2, 5, 8$

$\cancel{\begin{pmatrix} -2, & 2 \\ 1, & -2 \end{pmatrix}}$ $\begin{pmatrix} 1, & -1 \\ -2, & 1 \end{pmatrix}$ $3x - 2y = d$

$12 - 2y$

$3x - 2y = d$

$d = 2, 5, 8$ only 3 values ✓

$12x - 2y = d \rightarrow d = 0, \ldots 8$

$3x - 8 = d \rightarrow d = -8, -5, -2, 1, 4, 7, 10, 13, 16 = (1, 4, 7, 1, 4, 7, 1, 4, 7)$ 3 cases

$\cancel{\begin{pmatrix} 1, & -1 \\ -2, & 1 \end{pmatrix}}$ ~~l.d, $x = 4$~~ ~~u.d, $3x - 2y = d$~~ $\begin{pmatrix} -2, & 2 \\ 1, & -2 \end{pmatrix}$ l.d is $x = c$

u.d is $-3x + 4y = d \rightarrow d = (2, 5, 8)$ ✓

$\cancel{\begin{pmatrix} -2, & 2 \\ -1, & 3 \end{pmatrix}}$ $\begin{pmatrix} -1, & 1 \\ -2, & 1 \end{pmatrix}$ u.d is $x = c$

l.d is $-3x + 2y = d \rightarrow d = (1, 4, 7)$.

$\begin{pmatrix} 2, & -2 \\ 1, & -2 \end{pmatrix}$. $\begin{array}{l} i + 2x - 2y = 4 \\ j + x - 2y = 4 \end{array}$ $(x,y) = (4,2), (4,5), (4,8)$

$(i,j) = (0,4), (6,10), (12,16) \equiv (0,4), (6,1), (3,7)$

$\begin{pmatrix} -2, & 2 \\ 1, & -2 \end{pmatrix}$. $\begin{array}{l} i - 2x + 2y = 4 \\ i + x - 2y = 4 \end{array}$ $(x,y) = (4,2), (4,5), (4,8)$

$(i,j) = (8,4), (2,10), (-4,16) \equiv (8,4), (2,1), (5,7)$

(15) Light waves 1 reel sound (5)

(16) Dyn. Symmetry 41 plain slides (5)

(17) Famous Mathematicians. 50 plane slides (5) — Discussion of outstanding contributions of famous mathematicians from early Greeks to the present accompanies this set of pictures.

Ref (1) Univ. Extension Div., Univ of Arizona, Tucson

(2) Bureau of Visual Instr^n, " Colorado, Boulder

(3) Wm. H. Dudley Visual Edn Service, Chicago.

(4) Div^n of Gen. Extn, Univ. System of Georgia, Atlanta.

(5) Dept. of Visual Instn, State Univ. of Iowa, Iowa City

(6) Univ. Extn. Div^n, Univ. of Kansas, Lawrence

(7) Bureau of Visual Instruction, Univ of Wisconsin, Madison

Advt: Multi-model Geom. Constr^n set — Description sent on request. Also miscellaneous Math. Lab. Instruments

Exch

— Lafayette Instruments, Inc
440, North Market Street
East Palestine, Ohio

ibid: Nov. 1938. p. 573. Lecture on Geometries by Mayme I. Logsdon

Refresher

ibid : May 1937.

Ref || Undergraduate Instruction in Mathematics
by J. I. Tracey

June-July, 1937

Ref || Thinking vs Manipulation by W. B. Carver

Aug-Sept, 1937, p. 445

Ref || Required Math. in a liberal Arts College by W. L. Schaaf

---

Jan. 1938, p. 32. Advice to the graduate Asstt
by A. D. Campbell

Schulshaus 5x5 prime associated nasic
by Mitrās method appears entirely difficult

1013	251	449	911	881
1930 -x	2590 -y	1402 -z	1402 -y	x+2y +z-3819
41	173	701	1229	1361
x	y	z	y-1188	4693 -2y-x-z
521	491	953	1151	389

3505 1575	3505 915	3505 2103	3505 4693	4693
1930	2590	1402	1188	1188
				3505

3505 2103	7324 3505	3505 2631	
1402	3819	874	
		3819	4693

(b11)

p. 601. Math. Edn in Germany before 1933 — R. Courant.

p. 607. Linkage for describing curves ∥l to ellipse
Exch ∥ — R.C. Yates, Univ of Marlyland

---

p. 617. ∥ A math. musical farce entitled "It can't happen here".

Ibid: Dec, 1938: p. 685 — Review of 2nd Int. Congr. of recr. math.

---

p. 686 — Review of "Knight Problem generalized".

Ibid. Jan, 1939. p. 3. Some recent advances in
Ref ∥ algebra by Saunders MacLane

---

p. 32. Course in Algebra for prospective secondary
Ref ∥ school teachers of mathematics by
W. H. Erskine

---

p. 45. Club topics: Polar planimeter
W. Cox - The Polar Planimeter, Kenffel & Esser 1951.

Conferences for secondary school math. Clubs:

So Malhari Rao's problem has led to some interesting results viz:

(1) for a non-associated square, if positions of 1 and 25 are given ie these positions are not in complementary cells, we can still find $a+a'$, $b+b'$ ie the B.M, and find cases for which the square is nasik ~~Hence the square is magic~~

(2) If square be taken associated, position of 1 determines position of 25 & also the B.M. we can determine possible (a, b)'s & these give the possible cases as in Andrews fig. 12 & 13, p. 10, and also some additional ones. Thus one can simultaneously get both the schemes in both the figures although taking all 25 positions of 1 would be quite laborious work.

(3) Further we can check which of these are also nasik squares.

Let us test truth or otherwise of 1. by taking an example say 1 at (4,1) and 25 at (3,3).

Arbitrarily then the B.M is $(4-2, 1-3)$ ie $(2,-2)$

$a+a' = 2$, $b+b' = -2$

$a = \pm 1, \pm 2$

$b = \pm 1, \pm 2$

$(a,b) = (\pm 1, \pm 2), (\pm 2, \pm 1), (\pm 2, \pm 2)$

$= (1,2), (-1,2), (1,-2), (-1,-2), (2,1), (-2,1), (2,-1), (-2,-1)$

$(a', b') = (1,0), (3,1), (1,0), (3,0), (0,2), (-1,2), (0,-1), (-1,-1)$

many only two cases $\begin{pmatrix} -1 & -2 \\ 2 & 1 \end{pmatrix}, \begin{pmatrix} -2 & -1 \\ 1 & 2 \end{pmatrix}$

25	25	25	25	25
25	25	25	25	
1	1	1	1	

(0,-2)
(0,1)
(-1,1) (2,1)
(0,1) (-2,1)
(1,1) (-2,-1)
(2,-2) (0,-2)
(-2,-2)
(3,1)

$i = (1-2)2 = -2$
$j = (1+2)2 = 6$

$a+a' = 2$
$b+b' = -2$

$(a, b) = (\pm 1, \pm 2)$
~~$b = (0, \pm 2)$~~
$(1,2), (-1,2), (1,-2), (-1,-2), (2,1), (-2,1), (2,-1), (-2,-1)$
~~$(0,2), (0,-2)$~~
$(2,2), (-2,2), (2,-2), (-2,-2)$
$(0,-2)$
$a' = (0), (4,-4), (x), (x)$
$(-1,1)$ x
$(2,2), (-2,2), (2,-2), (-2,-2)$

x for nasik

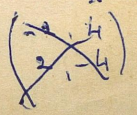
5	7	14	16	23
11	18	25	2	9
22	4	6	13	20
8	15	17	24	1
19	21	3	10	12

R.M $(-1,2)$

nasik all right

21	7	18	4	15
3	14	25	6	17
10	16	2	13	24
12	23	9	20	1
19	5	11	22	8

nasik all right



Ref to Mathemagic by Royal V. Heath, a member of the New York Stock Exchange whose hobby is magic from the mathematics standpoint. Enth

---

Math. Gaz: Feb. 36, p. 7. Address by A. W. Siddons on Progress Ref

---

Advts of RE books on Aspects of teaching mathematics

May, 1936, p. 116. Exhibition of Math. films – Ref. to Dance – Kaufmann films prices 10s to £1.
Address. Stewart Films, The Studios, North Fambridge, Chelmsford, Essex Enth
Films on (1) Math. processes (2) Harmonic motion –
Films by Kodak Ltd – Einstein's Relativity

---

p. 73. Work of for Univ. Ent. Schs Ref
p. 93. Ridley work in Geometry.

July 36: p. 172. The Physics of Sport – G. T. Walker
Ent Ref

(2, 2), (−2, 2) are not shown in fig. 13.

~~Sa Malhari Rao's problem has led to something really interesting~~

for which $x = y$ can be located for position

Here say (x, y) (3, 3), $\{4 + 3(a+a'), 1 + 3(b+b')\}$ ie $(-4, -5) = (1, 0)$ is posn of 19.

(1, 1) $\{4 + a + a', 1 + b + b')$ ie $(3, -1) \equiv (3, 4)$ is posn of 7. These positions of 19 & 7 are fixed for all the 6 possible cases. Also note that (1, 7, 13, 19, 25) is a magic series. Let one case, say the case where R.M is extended K.M say (2, 2) [B.M is (−1, −2)]

R.M (2, 2)

16	23	5	7	14
25	2	9	11	18
4	6	13	20	22
8	15	17	24	1
12	19	21	3	10

a but only semi-nasik.

R.M (1, 1)

18	21	4	7	15
25	3	6	14	17
2	10	13	16	24
9	12	20	23	1
11	19	22	5	8

a but not n

* p. 275 – Models of an abacus (Cale-machine)
Messrs Platt & Co,
Educational Publishers
(305) Bhagan
for members 15% off

Enh

* Oct, 36 . p. 233. Teaching of loci in Elem. Geom to S.S.d.C. stage, by C.V. Durell
Ref

---

p. 272 – on Vector notation – Hartree, Chapman & Milne

Dec 36 . p. 298 . Eddington's probability problem – about A, B, C, D each speaking the truth once in 3 times

---

p. 318 . Some difficult Saracenic designs III by E. Hanbury Hankin – A beautiful design – Ref. to Memoirs of the Archaeological Survey of India No. 15, 1925, Fig 39
Enth

---

p. 324. on teaching of indices and logarithms – by E.V. Smith
Ref

May, 37 . p. 82. The development of the teaching of Geometry in Germany – G. Wolff .
Ref

7	14	16	23	5
18	25	2	9	11
4	6	13	20	22
15	17	24	1	8
21	3	10	12	19

n & a ✓

7	18	4	15	21
14	25	6	17	3
16	2	13	24	10
23	9	20	1	12
5	11	22	8	19

n & a ✓

$3 + 3(a+a') = 3+6 = 9 = 4$

$1 + 3(b'+b) = -5 \equiv 0$

& 19 at (4,0)

Instead of taking 1 in the l.d or u.d, let us take 1 in some other position say $(i,j) = (4,1)$, then 25 is at $(0,3)$ & B.M. is $(-1,-2)$ ie $[(4-0, 1-3)$.

ie $a+a' = -1$, $b+b' = -2$.

$a = \pm 1, \pm 2$, with $a \neq -1$ since this gives $a' = 0$

$b = \pm 1, \pm 2$: with $b \neq -2$ " $b' = 0$.

$a = 1, 2, -2$ | $b = 1, -1, 2$

$a' = -2, 2, 1$ | $b' = 2, -1, 1$

~~which~~

Given (i,j) & B.M, can we find nos. in the several cells? No; because this requires knowing a, a', b', b' separately. ~~any~~ can elements in the ~~day~~ l.d ~~can~~ be found? ~~Take for as~~ no not necessarily. only those numbers

$\begin{pmatrix}1,-2\\1,2\end{pmatrix}$, $\begin{pmatrix}1,-2\\-1,-1\end{pmatrix}$, $\begin{pmatrix}1,-2\\2,1\end{pmatrix}$ ✓ ✓ ✗

$\begin{pmatrix}2,2\\1,2\end{pmatrix}$, $\begin{pmatrix}2,2\\-1,-1\end{pmatrix}$, $\begin{pmatrix}2,2\\2,1\end{pmatrix}$ ✓ ✗ ✓

$\begin{pmatrix}-2,1\\1,2\end{pmatrix}$, $\begin{pmatrix}-2,1\\-1,-1\end{pmatrix}$, $\begin{pmatrix}-2,1\\2,1\end{pmatrix}$ ✗ ✓ ✓

leaving 6 cases. $\begin{pmatrix}1,-2\\1,2\end{pmatrix}$, $\begin{pmatrix}1,-2\\-1,-1\end{pmatrix}$ for diagonal R.M's

and $\begin{pmatrix}2,2\\1,2\end{pmatrix}$, $\begin{pmatrix}2,2\\2,1\end{pmatrix}$, $\begin{pmatrix}-2,1\\-1,-1\end{pmatrix}$

$\begin{pmatrix}-2,1\\2,1\end{pmatrix}$

for K.M's & extended K.M's for R.M's.

of these four none gives a nasik square.

These tally with Andrews figs 12 & 13 on p. 10. except ~~that~~ for the fact that the extended

p. 106. Ref — The history of Math: its relation to pupil and teacher by R.M. Gabriel

---

p. 117. Ref — Trial & error & approx. in Arithmetic by A.C. Aitken

---

p. 123. Ref — English and French teaching methods compared.

---

p. 140. Ref — A weighty matter — G.H. Grattan-Guiness (Mass & Wt.)

---

p. 149. — Report on Math. Films by the Film Sub Committee

(1) "Simple Machines" (Kodak)

(2) "The angle-sum of a triangle" (Mr B.G.D. Salt) — an interesting rather than a really useful film

(3) "The eqn $\ddot{x} + X = 0$" (Mr R. Fairthorne & Mr Salt) — most ingenious devised, well carried out and very int. to watch

(4) "Diff. between slip & creep in Belt" (Dance-Kaufmann No. 9a1)

Enth

$a+a'=2$
$b+b'=-2$

(i) (ii) (iii) (iv) (v) (vi)

$\begin{pmatrix}1&1\\1&e_2\end{pmatrix}, \begin{pmatrix}-1&-2\\-1&-1\end{pmatrix}, \begin{pmatrix}1&1\\2&1\end{pmatrix}, \begin{pmatrix}-1&-2\\2&1\end{pmatrix}, \begin{pmatrix}-2&-1\\1&2\end{pmatrix}, \begin{pmatrix}-2&-1\\-1&-1\end{pmatrix}$

when does 15 is $(4,2)$ is $(3+4+2, 1+4+4)$ is $(9,9)$ is $(4,4)$. for (i)

$(3-4-4, 1-4-2)$, $(-5,-5)$ is $(0,0)$. for (ii)

$(3+4+2, 1+8+2)$ is $(9,11)$ is $(4,1)$ for (iii)

$(3-4-4, 1+8+2)$ is $(-5,11)$ is $(0,1)$ for (iv)

$(3-8-2, 1+4+2)$ is $(-7,7)$ is $(3,2)$ " (v)

$(3-8-2, 1-4-2)$ is $(-7,-5)$ is $(3,0)$ (vi)

Thus taken 15 is $(2,1)$

$55'=12$ from 1 to 13 is $(1,1)$. $\begin{cases}3+2a+2a'=2 & 2a+2a'=-1, \ a+a'=2\\ 1+2b+2b'=2 & 2b+2b'=1, \quad b+b'=3\end{cases}$

$a=\pm1, \pm2, \quad a+a'=2$

$b=\pm1, \pm2 \quad b+b'=-2$

$(a=1, a'=1)$, $(a=-1, a'=2)$, $(a=2, a'=0)$, $(a=-2, a'=4)$

$(b=1, b'=2)$, $(b=-1, b'=-1)$, $(b=2, b'=1)$, $(b=-2, b'=0)$

$(a,b) =$ ~~$(1,1)$, $(1,2)$~~. $(1,1)$, $(1,-1)$, $(1,+2)$ ✓

$(-1,1)$, $(-1,-1)$, $(-1,2)$ ✓

$(2,1)$, $(-2,-1)$, $(-2,2)$

$(1,-1)$, $(-1,1)$, $(-2,2)$. do not appear.

$\begin{pmatrix}1&1\\-1&-1\end{pmatrix} \to ab'-a'b=0$

$\begin{pmatrix}-1&-2\\1&2\end{pmatrix} \to ab'-a'b=0$

$\begin{pmatrix}-2&-1\\2&1\end{pmatrix} \to$ "

} these three cases are eliminated

often six cases for norm square

$(1,1)$, ~~$(1,1)$~~, $(1,2)$, $(-1,-1)$, $(-1,2)$, $(-2,1)$, $(-2,-1)$

$(a',b')=(1,1)$ $(a',b')=(-2,1)$ $(a',b')=(-1,2)$ $(a',b')=(-1,-1)$

$(a,b) = (-1,2), (-2,1)$ are allowed. often square is norm 1 associates.

(5) "Hypocycloid Gear" (Dance - Kaufmann No. 9b1)
(6) "Intermittent movement 8:1 (" 9b2)
(4)(5)(6) useful for math. of Eng.

Addresses: 'Simple machines' - Kodak Ltd, Kodak House
Kingsway, London W.C.2, £ 9-10-0
hired at 3s per day

Angle-sum of a Δle - Mr B. G. D. Salt,
5. Carlingford Road
(Price 30s) Hampstead, London N.W.3

Eqn $\ddot{x} + x = 0$ Mr R. Fairthorne
Kirk-Michael, Hillfield Road,
(30s) Farnborough, Hants.

Dance-Kaufmann-Films -
Dance-Kaufmann
18. Upper Stanhope St,
(9a1 — 12s 6d Liverpool
Others — 10s each) (Dance - Kaufmann not
distributed by Messrs Stewart)

So putting complementary numbers in $(0,4)$ & $(4,0)$ other than $7 = (1,1)$ & $19 = (3,3)$ give $a, b = 0$ or $a', b' = 0$.

So ~~we must~~ let us take an element not on the ~~do~~ u.d, say 15 in $(2,1)$. ie $(x,y) = (4,2)$ in $(2,1)$

$$\left.\begin{array}{l} 3+4a+2a' = 2 \\ 1+4b+2b' = 1 \end{array}\right\} \quad \begin{array}{l|l|l} 3+2(a+a')+2a = 2 & 1+4+2a = 2 & 2a = -5 \equiv 0,\ a = 0 \\ 1+2(b+b')+2b = 1 & 1+6+2b = 1 & 2b = -6,\ b \equiv 2. \end{array}$$

(x,y) in (α,β) in (r,δ), $\left.\begin{array}{l} 3+\alpha a+\beta a' = r \\ 1+\alpha b+\beta b' = \delta \end{array}\right\} \begin{array}{l} \alpha a+\beta a' = r-3 \\ \alpha b+\beta b' = \delta-1 \end{array}$ $\quad \begin{array}{l} a+a' = 2 \\ b+b' = 3 \end{array}$

$$\left.\begin{array}{ll} \alpha a+\beta(2-a) = r-3, & a(\alpha-\beta) = r-3-2\beta \\ \alpha b+\beta(3-b) = \delta-1 & b(\alpha-\beta) = \delta-1-3\beta \end{array}\right\} \quad \left[\begin{array}{l} 2a = 2-3-4 = -5 \\ 2b = 1-1-6 = -6 \end{array}\right.$$

Suppose $\alpha-\beta = 1$, $\begin{array}{l} a = r-3-2\beta \\ b = \delta-1-3\beta \end{array}$

Take $\beta = 2, \alpha = 3$, $a = r-3-4$, $b = \delta-1-6$, $a = r-7$, $b = \delta-7$. $\quad a+a' = 2$

$r = 1$, $\delta = 3$, $a = -3$, $b = -2$, $(a,b) \equiv (2,3)$, or $(2,-2)$.

ie $(\alpha,\beta) \to 18$, ie 18 in $(1,3)$. Then 8 must be $(3,1)$ $\quad (a',b') \equiv 0$, —

ie $3+$

$\beta = 1, \alpha = 2 \to 12$, $a = r-3-2 = r-5$, $b = \delta-1-3 = \delta-4$, $a \equiv r$, $b \equiv \delta-4$

$a' = 2-r$, $b' = 3-\delta+4 = 7-\delta = 2-\delta$.

$r = 1$, $a = 1$, $a' = -1$; $\delta = 3$, $b = -1$, $b' = -1$

$\begin{pmatrix} 1, & 1 \\ -1, & -1 \end{pmatrix}$ $ab'-a'b = 0$ It looks to be a futile search.

According to Andrews Figs 12 & 13 on p. 10, with (i,j) at $(3,1)$. R.M's $(1,1)$, $(-1,-1)$ and $(\pm 1, 2)$, (-2 ± 1) are possible for associated squares.

All above supplied in 16mm Size

Ref to leaflet "Non-theatrical Cinematograph Apparatus & Films" published by The British Film Institute 4, Great Russell St, London W.C.1 (Price 6d)

for information re firms supplying films etc.

July, 1937. p. 182 | Ref | Soln of eqns by the use of progressive differences by F.C. Boon

---

Oct, 1937, p. 249. | Ref | The Reform of Mathematics by F.B. Pidduck

---

p. 259. | Ref ? | Discussion on the teaching of elementary Astronomy

---

p. 271. | Ref | A method of teaching by E.E. Ironmonger – Ref. to Lilavatha

---

Here $a+a'=1$, $b+b'=-1$. So the 8 possible choices ~~[illegible]~~ viz

$a = 1, 1, -1, -1, 2, 2, -2, -2$, $a' = \cancel{0}, \cancel{0}, \cancel{2}, 2, -1, \cancel{-1}, \cancel{-2}, \cancel{-2}$

$b = 2, -2, 2, -2, 1, -1, 1, -1$; $b' = \cancel{2}, \cancel{1}, \cancel{2}, 1, -2, \cancel{0}, \cancel{-2}, \cancel{0}$.

Left with only 2 cases $(2,1)$ and $(-1,-2)$ ie the Madhava Rao & Chakravarty cases.

In Malhari Rao's case $a+a'$, $b+b'$ are given ie break move & conv^n for square being nasik gives two sets of values for (a,b).

Suppose we want an associate square. (i,j) & $(a+a')$, $(b+b')$ are connected since 13 occupies the middle cell. Further, if B.M is given (i,j) are found, or if (i,j) be given, BM is known.

Suppose $(i,j) = (3,1)$ on u.d , $3 = 2(1-a-a')$, $1 = 2(1-b-b')$ $2(a+a') = -1$, $2(b+b') = 1$

$a+a' = 2$, $b+b' = 3$. If $(i,j) = (3,1)$, 25 also lies on u.d at $(1,3)$ ie

$i + 4(a+a') = 1$, $j + 4(b+b') = 3$, same $(a+a')$ & $(b+b')$

25
13 , If elements $(0,4)$ & $(4,0)$ have $(x,y) = (3,3), (1,1)$ or $(1,1), (3,3)$ ie 19, 7 or 7, 19 we get only $a+a'$. Suppose we take numbers in $(0,4)$ & $(4,0)$ to be 12 & 14 ie $(x,y) = (1,2)$ & $(3,2)$.

then $3 + a + 2a' = 0$, $1 + b + 2b' = 4$

$3 + 3a + 2a' = 4$, $1 + 3b + 2b' = 0$

$3 + (a+a') + a' = 0$, $1 + (b+b') + b' = 4$ ie $5 + a' = 0$, $4 + b' = 4$, $a' \equiv 0 \equiv b'$

$3 + 3(a+a') - a' = 4$, $1 + 3(b+b') - b' = 0$ $3 + 6 - a' = 4$, $1 + 9 - b' = 0$, $a' \equiv 0 \equiv b'$.

~~11~~ 9
~~15~~ 17 No square possible.

Suppose $(x,y) = (1,0), (3,4)$ are in $(0,4)$ & $(4,0)$

$3 + a = 0$, $1 + b = 1$, $b = 0$, no square.

$2b' = -1$
$3b' = -1$.

If $(x,y) = (3,1), (1,3)$ ie $(9,17)$ in $(0,4)$ & $(4,0)$

$\left.\begin{matrix} 3 + 3a + a' = 0 \\ 1 + 3b + b' = 4 \end{matrix}\right\}$ $\left.\begin{matrix} 3 + a + 3a' = 4 \\ 1 + b + 3b' = 0 \end{matrix}\right\}$ $\rightarrow$ ~~$(a,b) \equiv$~~ $a \equiv b \equiv 0$, $a' = 2$, $b' = 3$ no square possible

$k(n)$ number of representations of n as a product of factors greater than 1.

define $K(1) = 1$; $K(n)$ studied by Kalmár, E. Hille

$$K(n) = \sum_{m=1}^{n} k(m)$$ if ρ be $+^{ve}$ root of eqn.

$$\zeta(s) = 2$$

Kalmar proved $K(n) = -\frac{n^\rho}{\rho \zeta'(\rho)} + O\left(n^\rho (\log n)^{-\alpha \log\log\log n}\right)$

etc.

---

p. 232. H. Aoki – Scattering of fast neutrons – Experimental

Zs. f. Ang. Math u Mech: 19, 3 (June 39)

p. 166. E. Holder: Explicit form of dynamical eqns of motion of a rigid body relative to a fixed system. – obtained by using Ricci-Calculus – Interesting paper

---

Zbl. f. Math 20, 5 (24/6/39)

p. 210. Extract of joint article with K.V by J. Meixner

---

p. 206. Review of Weyl's new book by van der Waerden

p. 219. R.S. Varma – on Bessel functions of 3rd order in J. École Polytech

In all the cases considered we do not have $a \pm b$, $a' \pm b'$ all prime to n. So that there are no nasik squares for $n = 3$ & in general for $n = 3k$ ie regular nasik squares not possible. Of course, there may be other types of nasik squares of order 9.

[Rouse-Ball, p. 204, mentions "new rules have been devised to cover the cases where the order is divisible by 3 or 4"]

[Kraitchik, p. 171 says "R.V. Heath has shown that this square 3×3 (Fig 48) may be made panmagic by suitably orienting the squares of order 3"].

Verification of Kraitchik's cases starting with 1 in (4,0), (7,3) $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$

5	24	43	62	81	10	29	48	67
76	14	33	52	71	9	19	38	57
66	4	23	42	61	80	18	28	47
56	75	13	32	51	70	8	27	37
46	65	3	22	41	60	79	17	36
45	55	74	12	31	50	69	7	26
35	54	64	2	21	40	59	78	16
25	44	63	73	11	30	49	68	6
15	34	53	72	1	20	39	58	77

(41 in the centre) (1 in (4,0)

(associated)

59	78	16	35	54	64	2	21	40
49	68	6	25	44	63	73	11	30
39	58	77	15	34	53	72	1	20
29	48	67	5	24	43	62	81	10
19	38	57	76	14	33	52	71	9
18	28	47	66	4	23	42	61	80
8	27	37	56	75	13	32	51	70
79	17	36	46	65	3	22	41	60
69	7	26	45	55	74	12	31	50

(14 in centre) (1 in (7,6).

(not associated)

Kraitchik has considered on p. 106, the case $n = 15$ with the lattice $(x,y) = (1,1) + r(4,1) + s(-1,4)$

51 $D = 16 + 1 = 17$, $17a \equiv 4$, $a = 2$, $17b \equiv -1$, $b = 7$

68 85 102 119 $17a' = 14(-5) - 4 = -74 \equiv 1$, $a' = 8$, $17b' \equiv \{-14(3) + 1\} = -41 \equiv 4$, $b' = 2$

$17(a + a') = 14(-5) = -70 \equiv 5$, $a + a' = 10$, $17(b + b') = -14 \cdot 3 = -42 \equiv 3$, $b + b' = 9$

136 170 165 Schemes $\begin{pmatrix} 2 & 8 \\ 7 & 2 \end{pmatrix}$ $a + b = 3k = 9$, $a' + b' = 5l = 10$. $a - b = 5$, $a' - b' = 6$ — See p. 68

Vol-143

Nature · (4/3/39) · p. 357 - M. Born's Royal Institution discourse on "Cause, purpose and Economy of Natural laws - Min. principles in Physics

6/8/39 Accad. Lincei. Vol 24 - 7as. 7 (1/4/39)

p. 294. L. Toscano - Hermite & Laguerre 7ns - Proves in particular Szegö's formula

$$\frac{H_{2\nu+1}(x)}{x} = (-2)^{\nu}\,\nu!\,L_{\nu}^{(\frac{1}{2})}\left(x^2/2\right)$$

p. 298. G. Lampariello - 3-body problem

p. 319. A. Cavinato - Identity of Laue's & Bragg's relations

Ibid. 7as. 8. p. 389. G. Prick - Deformation of surfaces (Ref. to Bompiani)

Comptes. Rendus: t. 208. No. 18 (1/5/39)

BK p. 1379. M. de. Broglie's book on "Atoms, radioactivity & transmutations"

p. 1383. M. Marc. Eger - Characteristic property of harmonic & biharmonic fns

So there are nine common numbers for the two groups given by

$(1,1), (1,4), (1,7), (4,1), (4,4), (4,7); (7,1), (7,4), (7,7)$

ie $(11, 38, 65); (14, 41, 68), (17, 44, 71)$. The square will be magic if $\rightarrow (S = 369)$

9 one of these numbers is at the centre. In order of magnitude

$(1,1), (4,1), (7,1); (1,4), (4,4), (7,4); (1,7), (4,7), (7,7)$

$$\left.\begin{aligned} i + x + 2y &= 4 \\ j + 4x - 5y &= 4 \end{aligned}\right\}$$ with these values of (x, y) give

$(i, j) = (1,5), (-2,-5), (-5,-19); (-5,20), (-8,8); (-11,-4), (-11,35)$ is

$(-14, 23), (-17, 11)$

$\equiv (1,5), (7,4), (4,8), (4,2), (1,8), (7,5), (7,8), (4,5), (1,2)$.

This is to be verified – Colossal labour

So it looks as if in cases (2) & (4) of p. 54 there is only one soln

(7), (8), (9), (10), there are three solns

& (14), (15), there are nine solutions

The other cases left over are $(a+b=0, a'+b'=3k)$, $(a+b=3k, a'+b'=0)$, $(a-b=0, a'-b'=3k)$,

$(a-b=3k, a'-b'=0)$, $(a+b=3k, a'+b'=3l)$, $(a-b=3k, a'-b'=3l)$.

$$\left.\begin{aligned} ab' - a'b &= a(3k-a') + a'a = 3ak \times \\ ab' - a'b &= -aa' - a'(3k-a) = -3a'k \times \\ ab' - a'b &= a(a'-3k) - aa' = -3ak \times \\ ab' - a'b &= aa' - a'(a-3k) = -3a'k \times \\ ab' - a'b &= a(3l-a) - a'(3k-a) = 3la - 3a'k \times \\ ab' - a'b &= a(a'-3l) - a'(a-3k) = -3al + 3a'k \times \end{aligned}\right\}$$

So these other six cases make ~~a~~ $ab' - a'b$ not prime to n & hence ~~taboo~~ taboo

fines a new condition which is invariant for conformal transformations

---

p. 1387. B. Kwal – on photon theory

---

ibid. No. 19. p. 1483 – J. Marriani – A geometric interpretation of spin – (Ref. to Wigner, Van der Waerden)

---

ibid. t. 209, No. 2. p. 87. Gehenian – Statistics of corpuscles – de Broglie's theory developed

---

p. 89. G. Badaran – passages of particles across potential barriers – use of Whittaker's $W_{k,m}$ fns

---

Annals. Brunelles: t. 59. (12/7/39)

p. 130: Simonart – envelopes & congruences associated with a space curve (simple paper)

---

p. 257. Law of mass action – M. A. Boutaric (mathematical)

$a-b=-3$, $a'+b'=-3$. ; $a+b=5$, $a'-b'=7$

Upper diagonals given by $-3x+7y \equiv c$ —(1).

& lower " " $5x-3y \equiv c$. —(2)

Take from prop (0,3,6), (2,5,8), (1,4,7) for x in (1). Since $y=4$ gives magic series

$-3x+28=c$

$7y \equiv 1 \equiv 28$

$7y = 4+6 = 10$

$7y = 7+3$

$7y = 4 \equiv 49$ etc

$7y \equiv 1$ $+y \equiv 4$.

$7y = 1+6$

For (0,3,6), $c = 28 \equiv 1$. $c=1$ for from c, $y=4$ for prop (0,3,6).

(2,5,8), $c = 31 \equiv 4$ $c=4$, $y=7$ (2,5,8)

(1,4,7), $c = 34 \equiv 7$. $c=7$, $y=1$ (1,4,6)

For prop (2,5,8), $c=1,4,7$ lead to $y=1,4,7$

" (1,4,7), $c=1,4,7$ " $y=7,1,4$.

(0,4) (3,4), (6,4); (2,1), (5,1), (8,1); (1,7), (4,7), (7,7)

(0,7), (3,7), (6,7); (2,4), (5,4), (8,4); (1,1), (4,1), (7,1).

(0,1), (3,1), (6,1); (2,7), (5,7), (8,7); (1,4), (4,4), (7,4)

Using for $5x-3y \equiv c$ for prop for y and (0,3,6), (2,5,8), (1,4,7)

Since $x=4$ gives magic series, we have for these props $c = 20, 14, 17 \equiv 2, 5, 8$. $5x-3y+20=c$.

$5x-3y=2$

for (0,3,6), $c = 2,5,8$ leads to $x = 4,1,7$

(2,5,8), $c = 2,5,8$ " $x = 7,4,1$

(1,4,7) " " $x = 1,7,4$

ie (4,0), (4,3), (4,6); (7,2), (7,5), (7,8); (1,1), (1,4), (1,7)

(1,0), (1,3), (1,6), (4,2), (4,5), (4,8); (7,1), (7,4), (7,7)

(7,0), (7,3), (7,6); (1,2), (1,5), (1,8); (4,1), (4,4), (4,7)

J. Frank. Inst. July. 39

p. 69. Article on "Le Conservatoire National des Arts et Metiers Paris"

Books (1) Problems in Mechanics by G. B. Karelitz & others - N.Y. Macmilla
1939, $2.50

BK

(2) Elements of topology of plane sets of points by M. H. A. Newman
221 pp. N.Y. Macm. $ 3.50

---

(3) Intr. Atom. phys. H. Semat, 360 pp. N.Y, Farrar & Rinehart
$ 3.50

---

(4) Pastaus, Neutrons etc - Lectures of J. Solomon, Gauthier-Villars
1939, 100 fr.

---

(5) Plateau's problem - J. Douglas, N.Y, Scripta Math, 10 cents

---

Naturwiss: (30/6/39) Heft 26.

p. 441 Berlin Academy address to M. Planck on 60th year
Jubilee & Doctorate

Th-Kahlen

9.D.

of this case & the three of the ~~9.D~~ are to be verified, which means colossal labour.

[on p. 48 we raised the q^n. Are there 9 cases for $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$ in the 9.D. method. In view of the above the answer is no. There are only 3 cases].

Take the Islamic method $\begin{pmatrix} 1 & -1 \\ -1 & -1 \end{pmatrix}$. Here $a+b=0$, $a'-b'=0$. i.e. upper & Lower diagonals given by $x \equiv c$ & $y \equiv c$ const. The only case is $x \equiv y \equiv 4$. i.e. $(4,4)$.

$$\left.\begin{aligned} i + x - y &= 4 \\ j - x - y &= 4 \end{aligned}\right\} \to (i,j) = (4,3) \text{ i.e. pt}^{n} \text{ just below the centre}$$

Wonderful – Hats off to Islam.!

Take the Western method $\begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$ $a-b=0$, $a'+b'=0$. Same argument as in the Islamic case

$$\left.\begin{aligned} i + x - y &= 4 \\ j + x + y &= 4 \end{aligned}\right\} \text{ with } x=4, y=4 \to (i,j) = (4,5) \text{ i.e. just above centre}$$

Wonderful – Hats off to Westerners!

Poor Indian method, not unique, has 3 cases – just like Orissans with lots of squabbles of people quarrelling with each other. I wish there were 4 cases corresponding to the 4 castes!

Other cases for $n=9$ mentioned by Krachkovsky

$(x,y) = (1,1) + \lambda(8,1) + \mu(5,2)$. Use the schemes

$\begin{pmatrix} 1 & 2 \\ 4 & -5 \end{pmatrix}$ – Here $a-b=-3$, and $a'+b'=-3$.

This comes under case (15), p. 54

3, -1.

p. 442. H. Philipps – Ens of article on theoret. meteorology

---

p. 451. Hahn & Strassmann – Confirm of existence of "Trans-Uranium"

Proc. Roy. Soc. A. Vol. 171, No. 947 (7/7/39)

p. 496 – H. Fröhlich & N. F. Mott – mean free path of electrons in polar crystals.

In note note added in proof authors say "Prof. Born has kindly informed us of unpublished calculations by Dr Kellermann which confirm our results exactly. Also ref to Lyddane & Herzfeld (Phy. Rev. 54, 846, 1938).

---

p. 541. K. Lonsdale – on diamag. anisotropy of org. molecule – Ref to Raman's School

---

S. 69. Abstract: M. Fierz & W. Pauli – Rel. wave eqns for particles of arbitrary spin in an electro-magnetic field

---

S. 72. A mistake in the paper on Fluctuations pointed out by Dr Fierz is corrected

We get as before grouping corresponding to $C = 2, 5, 8$. The same cases as

$C = 2 \rightarrow -3y + 2x = 2$, $+y = (0,3,6)$ leads to $2x \equiv 2, 11, 20 \equiv 2$, $x = 1$.

Q $(2,5,8)$ leads to $x \equiv 4$ & $(1,4,7)$ to $x = 7$

$(1,0), (1,3), (1,6)$; $(4,2), (4,5), (4,8)$; $(7,1), (7,4), (7,7)$

or $(2,29,56), (23,50,77)$; $(17,44,71) \rightarrow S = 369$ a magic series.

Suppose $C = 5 \rightarrow$ ~~$x = 7, 4$~~, $-3y + 2x = 5$, $x = 7, 1, 4$ for the 3 series

$\rightarrow (7,0), (7,3), (7,6)$; $(1,2)(1,5), (1,8)$; $(4,1), (4,4), (4,7)$.

$\equiv (8,35,62)$; $(20,47,74)$; $(14,41,68) \rightarrow S = 369$ a magic series

Suppose $C = 8 \rightarrow -3y + 2x = 8$, $x = 4, 7, 1$.

$\rightarrow (4,0), (4,3), (4,6)$; $(7,2), (7,5), (7,8)$; $(1,1), (1,4), (1,7)$

$\equiv (5,32,59)$; $(26,53,80)$; $(19,38,65) \rightarrow S = 369$ a magic series

Upper main diagonal given by $y = 4$ & the corresp. magic sets being

$(37, 38, 39, 40, 41, 42, 43, 44, 45) \rightarrow S = 369$.

Of the three sets of magic series $(7,4), (4,4), (1,4)$ have ~~4 for~~ $y = 4$

14, 41, 68 i.e. 44, 41, 38 are on the diagonal $y = 4$

If these be brought to the centre we have 3 magic squares of order

$i + x - y = 4$, $j + x - 2y = 4$, $x = 4, y = 4 \rightarrow (i,j) = (4,8)$

$\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$ ~~$= 8$~~ $j = 11$

$x = 1, y = 4 \rightarrow (i,j) = (\cancel{7}\ 3) \times (7,2)$

$x = 7, y = 4 \rightarrow (i,j) = (1,5)$

In Frankel's case: $i - x + y = 4$, $j + 2x - y = 4$ $\Big\}$ $(x,y) = (4,4), (4,7), (4,1)$ i.e. 41, 68, 14

$\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ $(i,j) = (4,0), (1,3), (\cancel{7,8}), (7,6)$

We have verified Frankel's case with 1 in ~~$(4,8)$~~ $(1,3)$. The other two

Ap. J.: June 1939.

p. 679. Review of Smart's book by Chandrasekhar – good review something like mine.

Bk: in press (Chicago monographs)

H. N. Russell – Masses of the stars (Univ of Chicago Press)

Bks

B. J. Bok – Distribution of stars in space $2.50

Astronomical lantern slides – 100 slides at $62.50

Catalogue to be obtained from Univ. of Chicago Press, 5750 Ellis Avenue, Chicago, Ill.

Ind orders

Also 19 transparencies at $3 or 4 $ each

A Rusk. Zs. 4th Heft. July 1939

p. 216. Ref. to B. V. Raghavendra Rao & Parthasarathy

$c = 2 \rightarrow (0,1), (3,1), (6,1); (2,4), (5,4), (8,4); (1,7), (\underline{4},7), (7,7)$

$c = 5 \quad -3x + 2y \equiv 5$, $(0,3,6) \rightarrow 2y \equiv 5 \equiv 14, y = 7$

$(2,5,8) \rightarrow 2y \equiv 11, 20, 29, y = 1$
$\equiv 2, 2, 2.$

$(1,4,7) \rightarrow 2y \equiv 8, 17, 26 \equiv 8, 8, 8, y = 4$

$(0,7), (3,7), (6,7); (2,1), (5,1), (8,1); (1,4), (\underline{4},4), (7,4)$

Similarly $c = 8$ leads to $(0,4), (3,4), (6,4); (2,7), (5,7), (6,7); (1,1), (\underline{4},1), (7,1)$

of these $(4,7), (4,4), (4,1)$ have $x = 4$ which is lower diagonal

ie $(68, 41, 14)$. If these be brought to the centre we have magic square.

Looks very indirect based on knowledge of work in Kraitchik

Let us test this method by taking another case for $n = 9$, say the D.D. case, posed on p. 48.

$\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$ Here $a - b = 0$, $a' + b' = -3$. which is case (9) of p. 54.

* They conclude that pivotation quanta have spin 2π by showing that their eqns are same as Einstein's field eqns of general relativity.

upper diagonal given by $y = \text{const}$. Lower diagonal by $2x - 3y \equiv c$. $-3y + 2x = c$.

Here x, y interchange places of y, x in above Kraitchik's case. Grouping y wt

~~(0,3,6), (2,5,8), (1,4,7) [illegible]~~ $x \equiv 4$ gives magic series.

lower diagonals given by $2x \equiv c$, $2x + 3 = c$, $2x - 3 = c$. ie $c = 8, 5, 2$.

using the groups $(0,3,6), (2,5,8), (1,4,7)$

12/8/39. Naturwiss. Heft. 28 (14/7/39), p. 484 – Letter by Euler & Wergeland on Kosmic ray showers – mention Cascade theory – Bhabha, Heitler, Carlson & U. Oppenheimer & Arley

---

Helv. Phys. Acta. Vol. 12, Fasc. 4, p. 297. Abstract of paper by Pauli & Fierz on field eqns of particles * with arbitrary spin to appear in Proc. Roy. Soc.

---

p. 300. Stueckelberg & Patry: Intraction between nuclear particles
(Work which is to be latter's Doctorate thesis)

Ann. der. Phys.: Bd. 35. Heft 6 (1939)
p. 497. C-H. Krutzsch: Vortex rings – experimental paper with beautiful pictures & description of experiments.

Enh

J. Chem. Phys. July 39, p. 547. Elementary theory of Condensation by Oppenheimer & Eyring

(0,0), (1,0), (2,0), .. (8,0) → 1, 2, .., 9 → 45
(0,1), (1,1), (2,1), .. (8,1) → 10, 11, .. 18 → 14·9 = 126
(0,2), (1,2), (2,2), .. (8,2) → 19, 20, .. 27 → 23·9 = 207
(0,3), .. (8,3) → 28, .. 36 → 32·9 = 288
(0,4), .. (8,4) → 37, .. 45 → 41·9 = 369 ✓

How to get the upper diagonals from $-3x+2y \equiv c$?

$x=0, y=0,1, .. 8$. Give the nos $-3x+2y = 0, 2, 4, .. 16$ (0,2,4,6,8,1,3,5,7)

$x=1, y=0,1, .. 8$, $-3x+2y = -3, -1, 1, 3, .. 13$. (6,8,1,3,5,7,0,2,4)

$x=2, y=0,1 .. 8$, $-3x+2y = -6, -4, -2, 0, 2, .. 10$. (3,5,7,0,2,4,6,8,1)

$x=3, y=0,1, .. 8$, " $= -9, -7, -5, -3, -1, 1, 3, 5, 7$. (0,2,4,6,8,1,3,5,7)

$x=4, y=0,1 .. 8$, " $= -12, -10, .. 0, 2, 4$. (6,8,1,3,5,7,0,2,4)

$x=5$, " $= -15, -13, .. 1$ (3,5,7,0,2,4,6,8,1)

$x=6$, " $= -18, -16, .. -2$, (" 16)

$x=7$, " $= -21, -19, .. -5$ (" 1)

$x=8$, " $= -24, -22, .. -8$ (" 1)

$-3x+2y \equiv c$. values of x from 0 to 8 can be grouped into three classes

(0,3,6), (1,4,7), (2,5,8)

leading to $2y$, $2y-3$, $2y+3 \equiv c$. for the upper diagonals.

$2y \equiv c$, $2y \equiv c+3$, $2y \equiv c-3$.

$2y = c$. $2y+3 = 4$, $2y-3 = 4$, $2y = 4$

2, 8, 14.
2, 8, 5.

$2y = 5$

$-3x+2y = 4$ $2y = 4$

$-3x+2y = 2$

$y = 1$, $2y = 8, 17, 26$ $= 8, 8, 8$

$y = 4$

-3
-12
-21

$2y = 5, 14, 23$
$= 14, 14, 14$
$y = 7$

-9
-18
-6
-15
-24

J. Opt. Soc. Amer: July, 1939, p. 302. A generalised formula for the Doppler-Effect by L. Fleischmann – A simple generalisation of usual case where vels of source & observer are along the joining line and are constant

Nuovo Cimento. A. 16. N. 3, March 39, p. 113. 108. Gentile – Limits of Quantum Electrodynamics in cosmic radiation

S || p. 136. P. Caldirola – Electromagnetism & relativity

J. Sci. Instruments: July, 39. p. 209. D. M. Myers – An integraph for soln of diff. eqns of 2nd order – Very fine paper with figures

Exh ||

p. 239 – Election to F.I.P of Parthasarathy S. Fellow Nobel Inst. of Royal Academy of Science Stockholm

J. de. Phys, S. 7 – t. X, June 1939, No. 6, p. 296.

37·9 333 6 38·9 2 7 (0,0) (0,1), (0,2), — (0,8) ; (1,0), (1,1), 18 9 7 39·9 (2,0), (2,1

$-3x+2y \equiv c$ 1, 10, 19, 28, 37, 46, 55, 64, 73 2, 11, 20, 74 3, 75 (4,0), 41·9

(55)

$x = 3, 6, 9, \ldots, y \equiv c, y = 4, 0, 3$ (3,0) (3,1) (3,8)

(0,4), (1,4), — (8,4) 4, 13, 22, 31, 40, 49, 58, 67, 76

37, 38, 39, 40, 41, 42, 43, 44, 45 → S = 369

14 = (4,1)
41 = (4,4)
68 = (4,7)

(3,4) → 40
(6,4) → 4

* Berkeley California

$-12+2y \equiv c$

2

$2y = 12 + c$ $c = -10 \equiv 8$
$c = -4 \equiv 5$
$c = 2 \equiv 2$

-6 3
-15 3
-24 3

(12, 41, 70, 18, 38, 67, 15, 44, 64)

(72, 11, 40, 69, 17, 37, 66, 14, 43), (42, 71, 10, 39, 68, 16, 45, 65, 13)

-24 + 2
-9 + 14

(2,1), (4,4), (6,7), (8,1), (1,4), (3,7), (5,1), (7,4), (0,7)
(8,7), (1,1), (3,4), (5,7), (7,1), (0,4), (2,7), (4,1), (6,4)
(5,4), (7,7), (0,1), (2,4), (4,7), (6,1), (8,4), (3,1)
} magic upper diagonals

-3 6
-12 6
-21 6

$-12+2y = 2, 5, 8$

$2y \equiv 14, 17, 20$
$y = 7, 4, 1$
$-12+2y = c$

-24+14
$-3x+2y =$ { -4, -4, -4, -22, 5, 5, -13, -13, +14 ≡ 5.
-10, -1, -1, -1, -19, 8, 8, -10, -10 ≡ 8
-7, -7, 2, 2, 2, -16, -16, -7 ≡ 2.

(2,1), (5,1), (8,1); (1,4), (4,4), (7,4); (0,7), (3,7), (6,7), upper diagonal magic series.
(1,1), (4,1), (7,1); (0,4), (3,4), (6,4); (2,7), (5,7), (8,7). " "
(0,1), (3,1), (6,1); (2,4), (5,4), (8,4); (1,7), (4,7), (7,7). "

(12, 15, 18); (38, 41, 44); (64, 67, 70)
(11, 14, 17); (37, 40, 43); (66, 69, 72)
(10, 13, 16); (39, 42, 45); (65, 68, 71)

(0, 3, 6) (2, 5, 8), (1, 4, 7)

$-3x+2y \equiv 2y$, $2y \equiv c$
$2y + 3 \equiv c$
$2y + 3 \equiv c$

J. Mariani : Sur les limites d'application de la géométrie métrique en physique nucléaire I -

S. || Quite an interesting paper with lots of new ideas good for preparing symposium paper

---

p. 307. Mlle P. Février - Indiscernability of Corpuscles - Meta physical & physical || but interesting speculations

---

Phil. Mag. Vol. 28, No. 186, July, 39, p. 118. A. C. Banerji - Arms of a spiral nebula.

---

p. 127. ~~Ad~~ Review of Rashevsky's book

Phy. Rev. Vol. 55, No. 1 (1/7/39) p. 1. P. Abelson* - Products of disintegration of Uranium splitting - gives tables relating to products which are chemically antimony, Te & I - refers to Hahn & Strassman's paper as a classical paper

---

p. 72. V. F. Weisskopf - Univ. of Rochester, New York -

Case $n = 9$ – Possible cases. always taking a, b, a', b',

$ab' - a'b$ all prime to 9. $a \pm b$, $a' \pm b'$.

(1) $a+b=0$, $a'+b'=0$, ~~$a+b=3k$~~ ~~$a'+b'=3k$~~
$a-b=0$, $a'-b'=0$, ~~$a-b=3k$~~, ~~$a'-b'=3k$~~
$a+b=3k$, $a'+b'=3k$
$a-b=3k$, $a'-b'=3k$

$(a+b)x+(a'+b')y \equiv c$
$3ky \equiv c$.
$-3y \equiv c$.

$\begin{pmatrix} 1 & , & -1 \\ -1 & , & -2 \end{pmatrix}$

(0,2)
0
-4

(1) $a+b=0$, $a'+b'=0$ ✗
(2) $a+b=0$, $a'-b'=0$ ✓
(3) $a-b=0$, $a'-b'=0$ ✗
(4) $a-b=0$, $a'+b'=0$ ✓

(5) $a+b=0$, $a'+b'=3k$ ✗
(6) $a+b=3k$, $a'+b'=0$ ✗
(7) $a+b=0$, $a'-b'=3k$ ✓
(8) $a+b=3k$, $a'-b'=0$ ✓

(9) $a-b=0$, $a'+b'=3k$ ✓
(10) $a-b=3k$, $a'+b'=0$ ✓
(11) $a-b=0$, $a'-b'=3k$ ✗
(12) $a-b=3k$, $a'-b'=0$ ✗

(13) $a+b=3k$, $a'+b'=3k$ ✗
(14) $a+b=3k$, $a'-b'=3k$ ✓
(15) $a-b=3k$, $a'+b'=3k$ ✓
(16) $a-b=3k$, $a'-b'=3k$ ✗

(1) $ab'-a'b = -aa'+a'a = 0$.
(3) $ab'-a'b = aa'-a'a = 0$.

16 possible cases.

I wonder how to deal with all these!

* Obvious classes of proofs like this proof with zero could be Course 9 Lecture replaced (more appropriate place).

Take the case dealt with on p. 49.

$\begin{pmatrix} -1 & , & 1 \\ 2 & , & -1 \end{pmatrix}$ Here $a'+b'=0$, $a-b=-3$ | Case (10) above.

$(a+b)x \equiv c$ i.e. $x \equiv c$ as lower diagonals start with $4=4$ for main lower diagonal.

upper diagonals $-3x + (a'-b')y \equiv c$., $-3x+2y \equiv c$.

For lower diagonals do upper values of c give maps does? say $c=3$

~~(2,3), (1,3), (2,3)~~ ~~(0,3)~~ (3,0), (3,1), - (3,8).

i.e. 4, 13, 22, 31, 40, 49, 58, 67, 76, $\rightarrow S = 360$ ✗

5 what about (0,4), - (8,4)?

37, 38, 39, ... 45 $\rightarrow S = 369$ ✓ (41 is common with (4,0,))

4 9 1+ +9

Read | On Self-energy & electromagnetic field of the electron –
A very imp. & int. paper. – Ref. to Mercier's paper in Helv. Phys
– clear introduction.

p. 99. Stratton & Chu (Massachusetts) – Diffraction theory
of electromagnetic waves – Vector analogue of
Green's theorem – classical Kirchhoff method
extended

*

p. 120. 7. Cernuschi: Supr-novae & neutron core stars
(Massachusetts). & tentative theory of cosmic rays – Two interesting
letters with reference to Bethe's paper in Phys. Rev.
55, 434 (1939) on energy production
in stars.

p. 124: Report by Lawrence & colleagues on the initial performance
of 60-inch Cyclotron of the W. H. Crocker
Radiation Lab, Univ. of California

Proc. Phys. Soc. Vol 51, 4/7/39.
p. 592-613, Langmuir & D. Wrinch – on structure

$(2,1),(1,2)$ $\quad$ $(1,2),(1,-1)$ $\quad$ $(1,2),(1,-2)$

$n=5$ (1) $\begin{pmatrix} -1, & 3 \\ -2, & 4 \end{pmatrix}$, (2) $\begin{pmatrix} 2, & -3 \\ -1, & 3 \end{pmatrix}$ (3) $\begin{pmatrix} -2, & 4 \\ -2, & 1 \end{pmatrix}$

$(1,2),(1,1)$ $\quad$ $(8,1),(5,2)$

$n=9$ (1) $\begin{pmatrix} -1, & 1 \\ 2, & -1 \end{pmatrix}$, (2) $\begin{pmatrix} 1 & 2 \\ 4 & -5 \end{pmatrix}$

$n=7$, $\begin{pmatrix} 4 & -3 \\ 2, & -2 \end{pmatrix}$ — There appears to be no direct way of ~~fd~~ guessing a, b, a', b'

$(1,1),(2,-2)$ $\quad$ from the given lattice eqns — ~~find~~ for regular ~~break~~ move ~~from~~

~~find~~ find (r,s) corresponding to $(2,1)-(1,1)$ & for break move from $(1,1)-(n,n)$.

For lattice $(1,1)+r(t,u)+s(v,w)$

regular move is given by $rt+sv=1$ $\quad$ $r(tw-uv)=w$, $r=w/D$

$ru+sw=0$. $\quad$ $s(uv-tw)=u$, $s=-u/D$

$a=w/D$, $b=-u/D$

$\begin{vmatrix} t & u \\ v & w \end{vmatrix}=D$

break move given by $rt+sv=1-n$, $r(tw-uv)=(1-n)(w-v)$

$ru+sw=1-n$ $\quad$ $s(uv-tw)=(1-n)(u-t)$

$r=(n-1)(v-w)/D$, $s=-(n-1)(t-u)/D$

$a+a'=(n-1)(v-w)/D$, $a=w/D$

$b+b'=-(n-1)(t-u)/D$, $b=-u/D$

$D^2(ab'-a'b)=w\{nu-(n-1)t\}+u\{(n-1)v-nw\}$
$=-(n-1)tw+(n-1)uv$
$=-(n-1)(tw-uv)$

$a'=\{(n-1)(v-w)-w\}/D=\{(n-1)v-nw\}/D$

$b'=\{-(n-1)(t-u)+u\}/D=\{nu-(n-1)t\}/D$.

$u-w$, w, $u+w$
$8v-9w$
$9u-8t$
$a'+b'\equiv 9(u-w)$
$-9(u+w)$
$-8(t-v)$

In (1) $D=3$, $a=\frac{2}{3}$, $b=\frac{1}{3}$ $\quad$ $(a,b)=(-1,-2)$, $a'=\frac{4-10}{3}=-2\equiv 3$, $b'=\frac{10-8}{3}=\frac{2}{3}=-1\equiv 4$.

(2) $D=-3$, $a=\frac{-1}{-3}=2$, $b'=-2/-3=1$ $\quad$ (3) $D=-4$, $a=-2/-4$ ~~$-4a=2$, $-8=$~~

$3a\equiv 1$. $\quad$ $3b\equiv 2$, $b=-1$ $\quad$ $2a=$ $a=-2$, $b=-2/-4=-2$

$a'=\frac{4+5}{-3}=\frac{9}{-3}$ $\quad$ $-3a'=9$, $a'=-3$ $\quad$ $b'=\frac{10-4}{-3}=\frac{6}{-3}=-2\equiv 3$ $\quad$ $a'=$

& so on nothing very simple for immediate use

-19 $\quad$ ~~$3a'=-1$~~

of insulin molecule – Discussion in which Bernal & E. H. Neville participated

---

p. 660. Machine for rapid summation of Fourier Series by Dr. C. A. Beevers – Discussion with Comrie

Exch. ||

Phys. Zs. Nr. 13, 40 J. p. 443. O. Mathias – Ballistic light-theory & Constancy of c

?

---

p. 460. Review of L de Broglie's "wave mech. of system of particles" by F. Sauter

---

p. 491. Reviews of Haupt-Neumann's book by Hans Schmidt & Volterra's book by F. Sauter

---

Rev. Sci. Instr. July 39, p. 220.

BK || Proc. 5th Int. Congress for App. mech, Wiley $6.00

BK || Die Physik des 20. Jahrhunderts by P. Jordan, Friedrich Vieweg & Sohn, Braunschweig, 1938

R. M. 5.90

Connection between lattice & moves

$a+b' = 2$
$b+b' = 2$

(i) $(1,1) + r(2,1) + s(1,2)$, regular move is $(-1,-2)$, break move is $(3,2)$

$a = -1, b = -2$
$a' = 3, b' = 4.$
$\equiv -2, \equiv -1$

for (6) $(1,1) + r(1,1) + s(2,-2)$ $(n=7)$

regular move is $(4,2)$, break move is $(1,0)$

$r+2s = 1, r-2s = 0, 4s = 1$
$s = 2$
$r = 4.$

$r+2s = -6$
$r-2s = -6$

$2r = -12, r = -6 \equiv 1$
$2s = -7 \equiv 2, s = 0$

(2) $(1,1) + r(1,2) + s(1,-1)$, r.m is $(2,-1)$, b.m is $(-1,2)$

(3) $(1,1) + r(1,2) + s(1,-2)$ r.m is $(-2,-2)$, b.m is $(2,-1)$.

(4) $m = 9$, $(1,1) + r(1,2) + s(1,1)$, r.m is $(-1,2)$, b.m is $(0,1)$ ✓

(5) $(1,1) + r(3,1) + s(5,2)$, r.m is $(1,4)$, b.m is $(+3,-1)$. ✓ $\begin{matrix} 1 & 2 \\ 4 & -5 \end{matrix}$

$8r+5s = 1 \quad 11s = -1 \quad s = 4, r = -8 \equiv 1$

$r+2s = 0 \quad 8r+5s = 8 \quad 11s = 66 \equiv 2 \quad (s = 1, r = 6 \equiv -3.)$
$r+2s = 8.$
$8r+16s = 64$

~~$r+s = 1, 2r-2s = 0, 3r = 1, r = 2, s = 4-1, (2,-1)$~~

$r = s = 2$ $r+s = 1, 2r+s = 0., r = -1, s = 2$ $(-1,2)$

$r+s = -8$
$2r+s = -8$ $s = -8, r = 0.$ $(0,1)$

$r+s = 1, 2r-2s = 0$ $2r = 1, r = -2, s = -2$ ✓

$r+s = -4, 2r-2s = -4., 4s = -4$ $s = -1, r = -3$ $(-3,-1) \equiv (2,-1)$ ✓

$r+s = 1, 2r-s = 0.$ $3r = 1, r = 2, s = 4$ $(2,-1)$ ✓

$r+s = -4$
$2r-s = -4$ $3r = -8 = -3, r = -1, s = -3,$ $(-1,-3)$ or $(-1,2)$ ✓

$2r+s = 1, r+2s = 0$ $-3s = 1 = 6, s = -2, r = 4$ $(4,-2), (-1,-2)$

$2r+s = -4$
$r+2s = -4$ $(2,2)$ ✓
$3s = -4 = 6, s = 2, r = -3.$

Reviews of mod. Physics · Jan, 39.

Interesting article on Vander Waals forces by H. Margenau – beautiful historical introduction

---

Arkiv f. mat, astr och fys : Bd. 26, H. 4.

2 articles by Bohlin on Euler's theorem

Ostrowskion Fredholm's determinants.

T. Gustafson – Exact solns of problem of quantum-electrodynamic eigen-energy

Refs to Mercier's paper in Helv. Phys. Acta – Heitler book, Born (Nature 19, 2. 1938) – huge article – thanks to Bohr

---

O. Frostman – on subharmonic fns

C. W. Oseen – on a diffl. eqn appearing in the theory of motion of plastic bodies – uses an artifice

8,9 7,8 $(2,1)-(1,1)=(1,0)$

$8r+5s=1$ $-16s+5s=1$

$8r+20s=0$ $-11s=1$

$r+2s=0$. $s=4, -44, r=-8\equiv 1$

$8r+5s=7$ $8r=1$.

$r+2s=8$

$-11s=7$. $s=1$

$r=6$

$\begin{pmatrix} 1 & 2 \\ 4 & -5 \end{pmatrix}$ $a-b=-3$, $a'+b'=-3$

For $n=9$ in all the cases.

with a, b, a', b' prime to n & $ab'-a'b$ prime to n.

$a-b$, $a+b$, $a'+b'$, $a'-b'$ will be multiples of n.

So the method obtained for n prime has to be modified here. Gratchulles lattice inverses appears too complicated.

Calculate Shp. Inv. Accuracy age. Usser, Master

$a-b$, $a'-b'=0$

$\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$, $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$ $\begin{pmatrix} 1 & -1 \\ -1 & -1 \end{pmatrix}$ $\begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$

$a-b'=-3$	$a-b=0$	$a+b=0$	$a-b=0$
$a'+b'=0$	$a'+b'=-3$	$a'-b'=0$	$a'+b'=0$
	Indian	Islamic	western

$2,-7$ $y\equiv c$, $7,-13$ $x\equiv c$, $c=4$

(nilgiris)

32

$x=4, y=4$.

$i+x-y=4$ $i=4, j=12$

$j-x-y=4$. (4, 3) unreal point

$i=4$

$j=-4=5$ (4,5) unreal point

$(-5,-6)$ $(1,1)$

$i+x-y=4$

$j+x-2y=4$.

$(i=4, j=8)$ unreal point

$a, b, a', b', ab'-a'b$ all prime to 9

$a-b$, $a+b$, $a'+b'$, $a'-b'$

$a=3k\pm1$, $a'=3k\pm1$

$b=3l\pm1$. $b=3l\pm1$.

$3k+1, 3k-1$

$3l+1, 3l-1$.

$a, b, a+b$

2, 2, 4. 2, 5, 7

4, 4, 8 - 1, 4, 5.

$a+b$ or $a-b$ both not prime to n

$a'+b'$ or $a'-b'$ not prime to n

Comptes Rendus U.S.S.R. Vol. 22. 1939.

No. 7, p. 390. D. Milman – Regular spaces (T3)

No. 8. p. 471, V. Smulian – Lineor topological spaces & their connection with Banach spaces

p. 477. Dabrowrawow – Generalisation of Hamilton-Jacobi's Theorem to Quasi-Coords

pp. 481-94: Three articles by K. N. Kolsky* on an elementary particle & a problem in Theory of Characteristics – References given will be useful for symposium lecture

S

No. 9, p. 543. M. Gowurin – 2 articles on Banach spaces

p. 553. Kantorovitch – Group theory work of Koulakoff

Ibid. Vol. 23, No. 4 p. 331 – V. Smulian – on diff. topologies in Banach space

No.

Kraitchik mentions only 3 cases viz where 68, 41 and 14 are in the centre. Let us ~~to~~ we have verified ~~the~~ cases of 68 being in the centre. Let us take the case of 77 being in the centre ie $(i,j) = (8,4)$.

450

41	60	79	17	36	46	65	3	22
31	50	69	7	26	45	55	74	12
21	40	59	78	16	35	54	64	2
11	30	49	68	6	25	44	63	73
1	20	39	58	77	15	34	53	72
81	10	29	48	67	5	24	43	62
71	9	19	38	57	76	14	33	52
61	80	18	28	47	66	4	23	42
51	70	8	27	37	56	75	13	32

So Kraitchik appears to be right we have not noted that

$a - b = -3$ is not prime to 9.

$-3x + 2y \equiv c$ comes as upper diagonal instead of $y \equiv c$ since as in case $n = 5$, we cannot take $a - b \equiv 0$. When $a - b$ is not prime to 5 //

$(4,7), (4,4), (4,1)$ $\quad y \equiv 4$ $\quad -3x + 2y \equiv c$.

$(0,4), (1,4), \ldots (8,4)$ $\quad -12 + 2y,\ 2y \equiv c + 12$.

$(0,7), (1,7), \ldots (8,7)$ $\quad 3x \equiv 2y - c$.

$(0,1), (2,1), \ldots (8,1)$.

If 68 be in centre upper diagonal elements are 42, 71, 10, 39, 68, 16, 45, 65, 13.

$(5,4), (7,7), (0,1), (2,4), (4,7), (6,1), (8,4), (1,7), (3,1)$.

$-15 + 8$

$-21 + 14$

$-3x + 2y \equiv$ ~~(-11)~~, $-7, -7, 2, 2, 2, -16, -16, 11, -7$.

$\equiv (2, 2, 2, 2, 2, 2, 2, 2, 2)$ //

-12 $\quad y = 4$

$-3x =$ $\quad 2y \equiv 14$. $\quad y \equiv 7$.

$-12 + 14 = 2$

$(4,1), (4,4), (4,7)$

$-3x + 2y = -12 + 2, -12 + 8, -12 + 24$

$= -10, -4, 12$

$= 8, 5, 3$.

$-3 + 1$

$-9 + 2$

$c = 4, -2, -6$

$= 4, 7, 3$

$2y = 12 + c$. $\quad$ ~~a = 10~~

$c = -10, -8, 2$

$= 8, 1, 2$

No. 5. p. 450. V. Berestecki – Shape of β-spectrum in case of forbidden transitions

---

Crelle. Bd. 181. Heft 1. – Körpertheorie + Strahlen-Komplexes.

Math. ZS: p. 335. E. Cartan (95, Boulevard Jourdan, Paris). (Bd. 45, 3 Hefte) – Sur des familles remarquables d'hypersurfaces isoparamétriques dans les espaces sphériques – A beautiful paper bringing together several notions in geometry

---

p. 405. R. Mehmke – Geometry of polygons, polystopes & polyhedra.

Math. Ann. Bd. 116, 5. Heft.

p. 749 – on a binomial coeff. identity

Proc. Phy-Math. Soc. Japan. Vol. 21, No. 6.

p. 263. Trajectories in non-holonomic unified field theory

S

4,9. $-9+1-5$ 4,9. (16) 4,2 360

(49)

$x+ny+1$.

(16) (4,0), (4,1), ... (4,8) → 5, 14, 23, 32, 41, 50, 59, 68, 77 → S = 369

$i - x + y = 4$
$j + 2x - y = 4$

$(i,j) = (8,-4), (7,-3), (6,-2), (5,-1), (4,0), (3,1), (2,2), (1,3), (0,4)$.
$= (8,5), (7,4), (6,7), (5,8), (4,0), (3,1), (2,2), (1,3), (0,4)$.

8 1 1

81

(4,1), (4,4), (4,7)

(* Reference from ~~[illegible]~~ the (4/3/39) is one containing Born's Royal Institution address up to (15/7/39) has got to be referred to at the CSLy — Phys. dist — Removed at first)

32	51	70	8	27	37	56	75	13
22	41	60	79	17	36	46	65	3
12	31	50	69	7	26	45	55	74
2	21	40	59	78	16	35	54	64
73	11	30	49	68	6	25	44	63
72	1	20	39	58	77	15	34	53
62	81	10	29	48	67	5	24	43
52	71	9	19	38	57	76	14	33
42	61	80	18	28	47	66	4	23

369 369 369 369 369 369

1 in (1,4) (68 in the centre) (not associated)

73	62	81
78	52	71
63	42	61
54	32	51
45	22	41
36	12	31
27	2	21
18	73	11
	72	1

Zbl. f. math. 20 Bd, 6 Heft. (3/7/39)

p. 273. Born's article in Proc. Ind. Acad on reciprocity noticed by by Weizsäcker

---

S || E. Foradori – Zs. f. Phys 111, 537-58 (1939) – Das Raumbild der Physik – Jordan has some interesting remarks on this paper

---

p. 275. Aulueck's paper in Phil. Mag on Fermi gas by Jordan

S || J. Mariani: Quantum of light: Comptes Rendus, 208 640-41

---

p. 284: Abstract of Tolman's, Offenheimer & Volkoff's, and Volkoff's papers on rel. treatment of fluid spheres – Abstracts by Mc Crea.

Nature (15/7/39)* p. 118. Letter by Stueckelberg on a new model of point charge electron & of other elementary particles – Refers to a paper of his in press in Comptes Rendus.

Read

Sc no regular ~~magic~~ nasik squares of order $3K$.

$n=9$; Take $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$ ~~arbitrary~~ s.d. Are these 9 cells of (i,j)?

$(i+x-y, j+x-2y)$ $\quad (a-b)x+(a'-b')y = c \rightarrow y \equiv c$ for u.m.d

Here again $a'+b' = -3$ ≢ prime to 9

For upper nasik diagonal $c=4$.

$(x,y) = (0,4), (1,4), (2,4), (3,4), (4,4), (5,4), (6,4), (7,4), (8,4)$

$x+ny+1 = (10, 11, 12, 13, 14, 15, 16, 17, 18) \rightarrow S = 126$ ~~$\frac{1}{2}n(n^2+1)$~~

$S = \frac{1}{2}\cdot 9\cdot(9^2+1)$
$= 9\times 41 = 369$

$37, 38, 39, 40, 41, 42, 43, 44, 45 \rightarrow S = 369$

$i+x-y = 4$,
$j+x-2y = 4$
$\Big\}$ $(i,j) = (8,12), (7,11), (6,10), (5,9), (4,8), (3,7), (2,6), (1,5), (0,4)$
$\equiv (5,3), (7,2), (6,1), (5,0), (4,8), (3,7), (2,6), (1,5), (0,4)$

22	41	60	79	17	36	46	65	3
12	31	50	69	7	26	45	55	74
2	21	40	59	78	16	35	54	64
73	11	30	49	68	6	25	44	63
72		20	39	58	77	15	34	53
62	1	10	29	48	67	5	24	43
52	71	9	19	38	57	76	14	33
42	61	80	18	28	47	66	4	23
32	51	70	8	27	37	56	75	13

Trivitchik, p. 163 for $n=9$. Fig 39

Swiss semi-magic square ~~given~~ Gq

Lattice $(x,y) = (1,1) + r(1,2) + s(1,1)$. We find from the figure the scheme $\begin{pmatrix} -1 & 1 \\ 2 & -2 \end{pmatrix}$

we can directly find the regular move & hence move from lattice eqn.

$2 = (2,1) \quad \therefore (2,1) - (1,1) = (1,0)$

$2 = r(1,2) + s(1,1) \quad r+s = 1 \quad r = -1$
$2r+s = 0. \quad s = 2.$

the regular move is $(-1,2)$.

$81 = (9,9) \quad r+s = 8 \quad r = 0, s = 8$
$r+2s = 8$

Put 1 at $(1,3)$ (starting number to start with) from 81 to 1, $s = -8 \equiv 1$ ie break move is $(0,1)$.

Scheme is $\begin{pmatrix} -1 & 1 \\ 2 & -1 \end{pmatrix}$ Here $a'+b' = 0$. $x \equiv c$ is horizontal.

Take $C = 4$ $\quad (a-b)x + (a'-b')y \equiv c$
$-3x + 2y \equiv c$ ∴ ~~vertical~~ ↑ vertical.

19/8/39. Proc. Roy. Soc. A. 172 (948) (19/7/39).

p. 89. Menzies on Raman lines of CCl_4

p. 94. Fröhlich – Elec. break down in ionic Crystals.

p. 110. Preston: Diffraction of X-rays by crystals
(Problem which N.S. Nath wrote he was discussing with Bragg?).

p. 127. S. Devons – Resonance phenomena in scattering of α-particles by light nuclei

---

Phy. Rev: 56 (2) (15/7/39) p. 186. Wavefns of relativistic H-atom by Leverett Davis, Jr – Shows that radial fns for discrete case of Dirac's eqn for H-atom can be expressed in terms of generalised Laguerre polynomials – Ref. to Coulson (p. 269, 290) & Polya – Szegö Vol 2, (1925) p. 293.
(Ask Sastry to look up this general type of polynom)

Read ✓

---

p. 188: On non-linear triatomic XY_2 molecule by Shaffer etc
Quant-mech calculations

p. 203. Interesting letter by Witmer E. E on regularity

$n+1,\ 2n$ (47) $(n,1)$

Modification of Rouse-Ball's generalisation using $(1,1), \ldots (\cancel{1}, n)$ for ~~rows~~ bottom row & $(1,1), (1,2), \ldots (1,n)$ for left column & replacing ξ, ξ' by x, y. Taking (a,b) for regular move and (a',b') for the break move. For the step from x to $x+1$ $(x=1, \ldots n-1)$, ~~and~~ is the regular move (a,b) & from yn to $yn+1$ $(y=1, \ldots n-1)$ is the break move (a',b'). The step from 1 to $n+1$ is $= (n-1)(a,b) + (a',b')$ & from ~~yn to yn+1~~ 1 to $yn+1$

$= (n-1)(a,b) + (a',b') + (n-1)(a,b) + (a',b') + \ldots$ y times

$= y(n-1)(a,b) + y(a',b')$. From 1 to $yn+x+1 = \{y(n-1)+x\}(a,b) + y(a',b')$

[$a' \to a+a'$, $b' \to b+b'$ gives $y(n-1)(a,b) + y(a+a', b+b') + x(a,b)$

$yn(a,b) + x(a,b) + y(a',b') \equiv (xa+ya', xb+yb')$].

Perhaps we had better ~~have~~ have the same notation as in Rouse-Ball changing ξ, ξ' to x, y.

What about n being a composite odd no? say $n=9$.

$a \pm b$, $a' \pm b'$ being prime to n.

~~a+b~~ $a-b, a, a+b$, ~~8, 5, 8, 13~~

$a'-b', a', a'+b'$ $8-1, 8, 9$ ~~9, 7, 10~~

~~In (a, a+d, a+2d) at least one is divisible by 3.~~ ~~7, 3, 7, 7+3~~

$a = 3k+1$, $b = 3k+2$ ~~a+b~~ $3k-1,\ 3k+1$ $3k-1,\ 3k+2$

$a = 3k \pm 1$, ~~or 3k ± 2~~ $3k+1,\ 3l+1$. $3k+1,\ 3k+2$ $3k-2$ $3k-3+1$

$b = 3l \pm 1$, ~~or 3l ± 2~~ $3k+3-1$ $3(k-1)+1$ $3(k+1)-1$.

$$\begin{array}{c} a \\ b \end{array} \begin{pmatrix} 3k+1 & 3k-1 \\ 3l+1 & 3l-1 \end{pmatrix}$$ In all four cases either $a+b$ or $a-b$ is divisible by 3

in nuclear mag. moments it suggests that for any nucleus

$$\mu(1^2+2^2+3^2) = 14\mu = Rn$$

R being a rational number with small denominator

---

p. 204. Letter by W. Band on Klein's fifth dimension as spin angle – I call it phase.

---

p. 214. Abstract of a paper by Wigner & Eisenbud on the Saturation of forces derived from the Meson Theory

Bull. des Sc. math. 2me Sers – t. 63 – June 39

p. 163. Address of Picard to Cartan

– A beautiful tribute which may be translated for Student or Current Science

---

Liouville's Journal. t. 18 (1939). p. 157. R.S. Varma on Parabolic cylinder fns

---

Zbl. f. Math 20 (7) (18/7/39)

(vii) $\begin{pmatrix} 2, & 1 \\ 2, & -1 \end{pmatrix}$ break move $(3,1)$ ie $(-2,1)$ & extended K.m $(2,2)$ as regular move

only case $(i,j) = (-4,0) \equiv (1,0)$. $[a-b = a'+b' = 0]$

& so on. We can multiply such cases.

Summarising (1) $a, b, a', b', ab'-a'b$ all prime to $\underline{n}$ $= 2m+1$ are conditions to be satisfied in order that square be magic in orthogonals

(2) To make the square magic in main upper & lower diagonals, we can choose (i,j) by $i = m(1-a-a')$, $j = m(1-b-b')$ so as to put the middle number given by $(x,y) = (m,m)$ ie $m + nm + 1 = \frac{1}{2}\{(2m+1)^2+1\} = \frac{1}{2}(n^2+1)$ in the centre. This makes the square magic & associated. This is Rouse-Ball's constn & this is irrespective of whether $a \pm b$, $a' \pm b'$ are prime to $\underline{n}$ or not.

(3) If any one of $a \pm b$, $a' \pm b'$ be not prime to $\underline{n}$, say $\equiv 0$, then ~~(i,j)~~ ~~the square may be made magic in the main~~ one set of diagonals (upper or lower) will be given by $y \equiv c$ or $x \equiv c$, the other set having the magic property. The main diagonal of the former set can be made magic by taking $c = m$ & choosing (i,j) so that any one of the numbers given by $(x,y) = (m,0), (m,1), \ldots (m, 2m)$ (for diagonal $x \equiv m$ or $(x,y) = (0,m), (1,m), (2,m) \ldots (2m,m)$ (for diagonal $y \equiv m$) may be in the centre of the square. These give $\underline{n}$ positions of (i,j) and the case where (m,m) is in the centre we have the associated case. All the $\underline{n}$ cases are semi-nasik (ie nasik in one set of diagonals only).

(4) If two of $a \pm b$, $a' \pm b' \equiv 0$ (excepting $a-b \equiv 0 \equiv a'-b'$ & $a+b \equiv 0 \equiv a'+b'$ since these make $ab'-a'b = 0$), the only possible case is ~~where~~ the associated one with $(i,j) = (m,m)$ & square is not nasik.

(5) If (1) is satisfied & also $a \pm b$, $a' \pm b'$ be prime to $\underline{n}$, any position of (i,j) gives a magic square which is nasik. [True only when $\underline{n}$ is prime] Sep-73 for Composite $\underline{n}$.

p. 292. Review of Hardy-Wright by Rohrbach

---

p. 297. C. Carathéodory: Entwurf für eine Algebraisierung des Int. begriff S-B. Bayr AKad, 1938, 27-69 (H1)

---

p. 316. Lampariello's paper on Liouville system by Bateman

---

p. 317. M. Ghermanescu - on a moment of inertia problem

---

p. 324: Jowan calls Kaliviaris's work as speculations

---

p. 329: Stueckelbergs criticism of Caldirola's work

---

p. 330: Jowan's criticism of Yvon's paper

Ibid 20(8) (1/8/39)

p. 351. K.S.K's Warsaw paper, abstracted by L. Egyed

---

p. 353 - K.S.K's paper on Cauchy - Maclaurin Integral test noticed by E. Blanc.

So sum of nos. in 4 d = 26 + 26 + 13 = 65
" = 26 + 26 + 13 = 65

ie magic property in diagonals in ensures. (This is argument in Rouse-Ball p. 205) the square is associated.

Here in cases $a+b=0=a'-b'$ and $a-b=0=a'+b'$, there is only one case with 13 in (2,2) & square is associated

For eg: (i) in the strict Siamese method $\begin{pmatrix} 1 & -1 \\ -1 & -1 \end{pmatrix}$ $a+b=0$, $a'-b'=0$.

and the only case is where $(i,j) = \{2(1-1+1), 2(1+1+1)\}$ ie $(2,6) \equiv (2,1)$
$\equiv (1-a-a', 2(1-b-b')$ ie the usual case associated only one (p. 21).

(ii) Western method $\begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$ Here $a-b=0=a'+b'$.
$2(1-2)$
& the only case is given by $(i,j) = (2,-2) \equiv (2,3)$. (p. 24).
(associated)

(iii) S.D. regular move & break move (2,0) ie $\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$ $a-b=0=a'+b'$

only case $(i,j) = \{a, \{2(1-2), 2(1-0)\} = (-2,2) \equiv (3,2)$ (Sharp. 28).

(iv) $\begin{pmatrix} 1 & -3 \\ 1 & -2 \end{pmatrix}$ S.D. regular move & break move $(-2,-1)$. Here $a-b=0=a'+b'$

only case $(i,j) = \{2(1-a-a'), 2(1-b-b')\} = (6,4) = (1,4)$.
associated

(v) $\begin{pmatrix} 1 & -2 \\ 1 & -3 \end{pmatrix}$ S.D. regular move & break move $(-1,-2)$ only case associated

$(i,j) = (4,6) = (4,1)$.

(vi) $\begin{pmatrix} 1 & -3 \\ -1 & 2 \end{pmatrix}$ Siamese regular move & break move $(-2,1)$. $a+b=a'-b'=0$

only case $(i,j) = (6,0) \equiv (1,0)$ associated

(vii) $\begin{pmatrix} 1 & -2 \\ -1 & 3 \end{pmatrix}$ Siamese regular move & break move $(-1,-2)$, $a+b=0=a'-b'$.

only case associated $(i,j) = (4,6) = (1,0)$.

p. 361. Hort's book "Diff. Eqns for engineers" 1939 Edn
Bk || J. A. Barth, R.M. 38

E. H. Moore's General Analysis Pt 2. Philadelphia
(Amer. Phil. Soc. Memoirs $3)

p. 368. K. Friedrichs – Diff. operators in Hilbert Space
Amer. J. Math, 61, 523–44 (1939)
(Introduces D = gradient, D* = neg. div)

p. 375. Ullrichs remarks on 3 films representing
conformal transformation

Nature (29/7/39) p. 190. Scientific films committee: A graded
list of 150 films available at a cost 1S. In addition
the Committee has compiled an index of scientific & film experts
willing to be put in touch with people requiring advice on
the making of films. Full particulars of services offered
can be obtained from the Secretary, Scientific Films
Committee, 30, Bedford Row, London, W.C.1
— Write at once

Enh

upper diagonal elements are (0,0), (1,1), (2,2), (3,3), (4,4)

" " are (4,0), (3,1), (2,2), (1,3), (0,4)

If the positions numbers for the positions $(0,0) \& (4,4)$ be $(x_0, y_0) \& (x_4, y_4)$.

$$i + ax_0 + a'y_0 = 0, \quad j + bx_0 + b'y_0 = 0.$$

& $\quad i + ax_4 + a'y_4 = 4, \quad j + bx_4 + b'y_4 = 4$

$$2(1-a-a') + ax_0 + a'y_0 = 0, \quad 2(1-b-b') + bx_0 + b'y_0 = 0.$$

[$(x,y), (4-x, 4-y)$. $x + ny + 1 + 4(4-x) + n(4-y) + 1 = 26 = n^2+1$]

$$x_4 = 4 - x_0, \quad y_4 = 4 - y_0$$

$$i + a(4-x_0) + a'(4-y_0) = 4, \quad 2(1-a-a') + 4a + 4a' - (ax_0 + a'y_0) = 4$$

$$j + b(4-x_0) + b'(4-y_0) = 4, \quad 2(1-b-b') + 4b' + 4b' - (bx_0 + b'y_0) = 4$$

$$2a + 2a' - (ax_0 + a'y_0) = 2$$

$$ax_0 + a'y_0 + 2(1-a-a') = 0. \text{ Simly } bx_0 + b'y_0 + 2(1-b-b') = 0$$

i.e $i + ax_0 + a'y_0 = 0, \quad j + bx_0 + b'y_0 = 0$ are both eqn.

In $(i + ax_0 + a'y_0, \; j + bx + b'y)$ changing x to $4-x$ & y to $4-y$

we get $\{i + a(4-x) + a'(4-y), \; --\}$

i.e $\{2 + 2a + 2a' - ax - a'y, \; 2 + 2b + 2b' - bx - b'y$

$\{4 - (i + ax' + a'y), \; 4 - (j + bx + b'y)\}$

Where $(i + ax + a'y, \; j + bx + b'y) = (\alpha, \beta)$

Changing x to $4-x$ & y to $4-y$ changes (α, β) to $(4-\alpha, 4-\beta)$.

i.e we have seen in [ ] that nos. corresp. to $(x,y) \& (4-x, 4-y) = 26$.

i.e nos in $(\alpha, \beta) \& (4-\alpha, 4-\beta)$ are complementary

& nos. in upper diagonals in $(0,0)$ & $(4,4)$; $(1,1) \& (3,3)$ are complementary

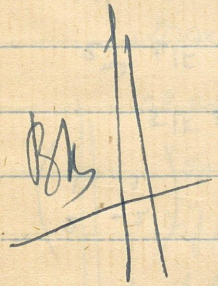
" " Corner " in $(4,0) \& (0,4)$; $(3,1) \& (1,3)$ "

Books: G. Boucheny – Curiosités et récreations mathématiques pp. 146 (Paris, Libr. Larousse, 1939)

Actualite 704 – L de Broglie: Correspondence principle & interaction of radiation & matter (70 fr)

Actualite 693: P. Brunet – Least action principle

Actualite: 729, J-L. Destouches – Mésotons



Reunion Int. de Phys, etc I. Physique generale (29 frs) (Paris Hermann et Cie)

V. Rojansky's book on Quant Mech (Blackie & Son Ltd 22s 6d net)

A. Scholz – Einfuhrung in die Zahlentheorie (Sammlung Göschen Bd 1131) (Walter de Gruyter & Co) 1·62 R.M

(ii) Knight's moves with Islamic break move $(0,-2)$

$\begin{pmatrix}2,-2\\1,-3\end{pmatrix}$, $\begin{pmatrix}2,-2\\-1,-1\end{pmatrix}$ $\begin{pmatrix}-2,2\\1,-3\end{pmatrix}$ $\begin{pmatrix}-2,2\\-1,-1\end{pmatrix}$ $\begin{pmatrix}1,-1\\2,-4\end{pmatrix}$ $\begin{pmatrix}1,-1\\-2,0\end{pmatrix}$ $\begin{pmatrix}-1,1\\2,-4\end{pmatrix}$ $\begin{pmatrix}-1,1\\-2,0\end{pmatrix}$

$\begin{pmatrix}\frac{1}{2},-1\\1,1\end{pmatrix}$ × $\begin{pmatrix}1,1\\2,-1\end{pmatrix}$ ×

6th & 8th don't give magic squares.

$1^{st}\{a'+b'=-5\}$, $3^{rd}(a'-b'=5)$, $5^{th}(a'+b'=-5\equiv 0)$, $7^{th}(a'-b'=5\equiv 0)$ give 5 cases each for (i,j)

2nd & 4th give magic squares whatever (i,j) [Also common regular $(1,-1)$ with 8 knight's moves as break moves]

(iii) Knight's moves with Wistem (Bachet) break move $(0,2)$.

$\begin{pmatrix}2,-2\\1,1\end{pmatrix}$ $\begin{pmatrix}2,-2\\-1,3\end{pmatrix}$ $\begin{pmatrix}-2,2\\1,1\end{pmatrix}$ $\begin{pmatrix}-2,2\\-1,3\end{pmatrix}$ $\begin{pmatrix}1,-1\\2,0\end{pmatrix}$ × $\begin{pmatrix}1,-1\\-2,4\end{pmatrix}$ $\begin{pmatrix}-1,1\\2,0\end{pmatrix}$ × $\begin{pmatrix}-1,1\\-2,4\end{pmatrix}$

5th & 7th are taboo

2nd, 4th, 6th & 8th give five cases each for (i,j) because $a'\pm b'=\pm 5$.

1st & 3rd give results whatever (i,j). [~~Also common~~ Consq regular $(1,1)$ with 8 break moves as break moves will be the same as in 9.D]

(iii) Suppose we now consider the case where only $a\pm b$, $a'\pm b'$, one from each set is zero for eg. $a+b=0$, $a'+b'=0$, $a+b=0=a'-b'$, $a-b=0=a'+b'$, $a-b=0=a'-b'$

Of these four cases ~~we rejected originally since~~ $a+b=0=a'+b'$ & $a-b=0=a'-b'$ makes $ab'-a'b=0$ & hence need not be considered, for the other two cases the upper & lower diagonals are given $x\equiv c$ & $y\equiv c$, and $y\equiv c$ & $x\equiv c$ respectively.

We should take simultaneously $(x,y)=(0,2),(1,2),(2,2),(3,2),(4,2)$ & $(2,0),(2,1),(2,2),(2,3),(2,4)$

the only ~~value~~ for (x,y) is $(2,2)$ & $i+ax+a'y=2$, $j+bx+b'y=2$

gives $i=2-2a-2a'$, $j=2-2b-2b'$.

$=2(1-a-a')$, $=2(1-b-b')$

H. Semat – Intr. to Atomic Phys (New York: Farrar & Rinehart Inc, 1939). $3.50.

H. Wieleitner – Alg. Curves. Teil 2 (Sammlung Goschen 436) Neudruck (Walter de Gruyter) 1.62 R.M.

---

p. 199: S. Imoshenko – Corresponding to Paris Academy

---

p. 200. Letter by Bohr, Peierls & Placzek on nuclear reactions in the continuous energy region discuss the typical difference between between nuclear reactions in the discrete & continuous regions of compound nucleus. The argument clears up an apparent difficulty as regards order of magnitude of cross sections of heavy nuclei for the photo effect with ejection of neutrons – the paper to be published in Copenhagen Acad.

Proceedings – Reference to general conservation theorem of wave mechanics by Bothe & Gentner (Z. Phys 106, 236 (1937) 112, 45 (1939)

Since $i + x - 3y = 2$, $j - x + y = 2$ lead to

$(i, j) = \cancel{(1,4),(2,3),(3,2),(4,1),(0,0)}\ (8,0), (7,1), (6,2), (5,3), (4,4)$

$\equiv (3,0), (2,1), (1,2), (0,3), (4,4)$ same as Fig on p. 30

Take other ~~break~~ Knights moves on pp. 32-36.

(i) $\begin{pmatrix} 2 & -2 \\ 1 & -2 \end{pmatrix}$ ie break move $(0,-1)$. Here $a' - b' = 0$ ie upper ~~lower~~ diagonals are $\equiv c$. $e = 2$ for main lower

$\cancel{(0,2),(1,2),(2,2),(3,2),(4,2)}\ (2,0), (2,1), (2,2), (2,3), (2,4)$

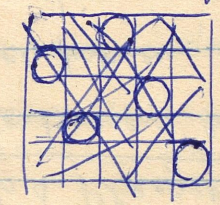
$i + 2x - 2y = 2$, $j + x - 2y = 2$ lead to

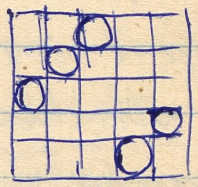
$(-2,0), (0,2), (2,4), (4,6), (6,8) \equiv (3,0), (0,2), (2,4), (4,1), (1,3)$

$(i, j) = \cancel{(4,6), (4,5), (2,4), (0,3), (-2,2)} \equiv \cancel{(1,1), (4,0), (2,4), (0,3), (3,2)}$

only case mentioned on p. 32 is $(2,4)$ giving associated square.

Should really be





Same I.D. method break move $(0,1)$ & the other Knight moves

$\begin{pmatrix} -2 & 2 \\ 1 & -2 \end{pmatrix}, \begin{pmatrix} 1 & -1 \\ 2 & -3 \end{pmatrix}, \begin{pmatrix} 1 & -1 \\ -2 & 1 \end{pmatrix}, \begin{pmatrix} -1 & 1 \\ 2 & -3 \end{pmatrix}, \begin{pmatrix} -1 & 1 \\ -2 & 1 \end{pmatrix}$ [Figs not given on p. 32]

1st, 3rd & 5th give five cases just as above. The second & 4th give nasik squares ~~for~~ ~~all possible~~ whatever (i, j). The other two cases of Knight moves (e.g. $(2,-1), (-2,-1)$ with schemes $\begin{pmatrix} 2 & -2 \\ -1 & 0 \end{pmatrix}, \begin{pmatrix} -2 & 2 \\ -1 & 0 \end{pmatrix}$ don't give magic squares because of $b' = 0$ //

[Also consider regular move $(1,1)$ with the break moves being the 8 Knights moves for eg $\begin{pmatrix} 1 & 1 \\ 1 & -2 \end{pmatrix}$ [break move $(2,-1)$] etc —

Letter by La. Goldstein and others on scattering of fast neutrons by H- nucleus

---

p. 209. Paper by A. J. Cobb (J. Roy. Hort. Soc., 64, Pt 5 May 1939) – on origin of Dahlia varieties & accounts of practical cultivation of Dahlias

Let this Journal from Lal Bagh

Ibid (22/7/39): p. 130 – Review of Chandrasekhar's book by Mc Crea under the heading "Analytical Astrophysics" – objects to the non-ap-part.

---

p. 136. Mc Donald Observatory, 2 eras by O. Struve

Science Progress July 39

p. 31. F. Simon – 2 emp. below 1°K.

Bk Boltzmann's Statistics & its modification by Quantum theory by Sommerfeld & Waldmann Eucken & Wolf Hdbuch Bd 3, Tal 2, Abs. III – IV

There are several other examples in previous pages. For eg

I.D. method with break moves $(-2,0)$ & $(0,-2)$ $(n=5)$

* What about idea of specific nuclear force being positional in character

ie $\begin{pmatrix} 1 & -3 \\ 1 & -1 \end{pmatrix}$ & $\begin{pmatrix} 1 & -1 \\ 1 & -3 \end{pmatrix}$ In both case $a-b=0 \longrightarrow y \equiv c$

for upper diagonals. $c=2$ for main upper diagonal

$(x,y) = (0,2), (1,2), \ldots (4,2)$

$$\left.\begin{array}{l} i+x-3y=2,\ j+x-y=2 \\ i+x-y=2,\ j+x-3y=2 \end{array}\right\} \text{lead to}$$

$(i,j) = (8,4), (7,3), (6,2), (5,1), (4,0) \equiv (3,4), (2,3), (1,2), (0,1), (4,0)$

& $(i,j) = (4,8), (3,7), (2,6), (1,5), (0,4) \equiv (4,3), (3,2), (2,1), (1,0), (0,4)$

same as in Fig on p. 28.

For the Islamic regular move & break moves $(0,2)$, $(-2,0)$ we have the schemes

$$\begin{pmatrix} 1 & -1 \\ -1 & 3 \end{pmatrix}, \begin{pmatrix} 1 & -3 \\ -1 & 1 \end{pmatrix}$$

Here $a+b=0$ ie lower diagonals are $y \equiv c$. $c=2$ for main lower diagonal

$(0,2), (1,2), (2,2), (3,2), (4,2)$

$i+x-y=2,\ j-x+3y=2$ lead to

$(i,j) = (4,-4), (3,-3), (2,-2), (1,-1), (0,0) \equiv (4,1), (3,2), (2,3), (1,4), (0,0)$

same as in Fig. p. 30

BK || Mem. des Sc. math. Fasc. 96 — by S. Zrinikoff

BK || Borel's Prob. Collection Fasc V — Statistical Quantum mechanics by F. Perrin
Gauthier-Villars

BK || van der Waarden's: Enf. alg. Geom. Bd. 51 of Grundlehren

---

20/8/39. Proc. Nat. Acad 25(7)(July 39).
p. 39. L. I. Schiff — A question of general relativity — treats rotation problem suggested by Oppenheimer

---

Nature (1/7/39). p. 30. Letter of P. M. S. Blackett connecting the recently discovered instability of the mesotron in free space with the gravitational constant! Proving a link between atomic & gravitational phenomena*

Similarly for $\begin{pmatrix} -1 & 2 \\ 2 & -3 \end{pmatrix}$

$i - x + 2y = 2$
$j + 2x - 3y = 2$ } for the sets (x,y)
$= (2,0), (2,1), (2,2), (2,3), (2,4)$
with the same magic series $(3, 8, 13, 18, 23)$

Setting
$(i,j) = (4,-2), (2,1), (0,4), (-2,7), (-4,10)$
$\equiv (4,3), (2,1), (0,4), (3,2), (1,0)$ same cases as above

---

Again take the 2-D case $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$. Here $(a-b) = 0$ i.e. upper diagonal $y \equiv c$.

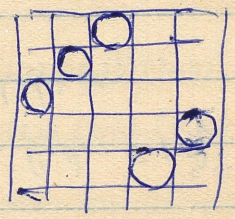
Taking $c = 2$ for the main upper diagonal $(x,y) = (0,2), (1,2), (2,2), (3,2), (4,2)$

leading, using $x + ny + 1$, to the magic series $11, 12, 13, 14, 15$

$i + x - y = 2$, $j + x - 2y = 2$ give

$(i,j) = (4,6), (3,5), (2,4), (1,3), (0,2)$
$\equiv (4,1), (3,0), (2,4), (1,3), (0,2)$

same as fig on p. 12.



For the 2-D method when $n = 7$, we take $c = 3$ for the main upper diagonal to get

$(x,y) = (0,3), (1,3), (2,3), (3,3), (4,3), (5,3), (6,3)$ giving the magic series

$(22, 23, 24, 25, 26, 27, 28)$ running up to $5 = 175$

and $i + x - y = 3$, $j + x - 2y = 3$ lead to the values of

$(i,j) = (6,9), (5,8), (4,7), (3,6), (2,5), (1,4), (0,3)$
$\equiv (6,2), (5,1), (4,0), (3,6), (2,5), (1,4), (0,3)$ as in fig on p. 19.

p. 46. Report of Hahn's lecture at Royal Institution on 23/6/39 on Fission of Uranium nucleus at which Bohr was present

---

p. 77. most interesting letter by D. Iwanenko (State Univ. Sverdlovsk, U.S.S.R) regarding a classical theory of the mesonic field using non-linear Born-Infeld methods.

Note ||

Scientific American: March 1939

p. 135. Fire-walking – feats of Khuda Bux explained

p. 148. Visualising hyperspace – Ralph Milne Furley – an attempt to peer into 4 dimensions

Enh ||

April 39: p. 205. Personalities in Science – E. P. Hubble

---

p. 219: Mathematical problems by L. Kaplan (Answers on page 251)

---

p. 220. H. N. Russell: Berenice's hair – this cluster is an ~~interior~~ interrelated system.

in (d) and (e). Both cases ~~have~~ give, when $(i, j) = (0, 4)$ associated squares. In both these cases, the lower diagonals have 1, 7, 13, 19, 25 in order. In the other four cases these numbers ~~form~~ ~~lay~~ all lie on ~~broken~~ lower broken diagonals. (d) & (e) might be called the Mathari Rao – Madhava Rao singular cases (!!!). In both these cases $a' - b' = 5 \equiv 0$ ie square is not nasik ~~& it is~~ but it is ordinary magic for five posns of (i, j).

The upper diagonals are given, in general, by $(a-b)x + (a'-b')y \equiv c$.

So here these are given by $(a-b)x \equiv c$ or $x \equiv c$, say.

We ~~have to~~ will choose posns of (i, j) such that $c = 2$ ie $x \equiv 2$ is the main upper diagonal & for corresp. values of y for these five cases are 0, 1, 2, 3, 4

ie $(x, y) = (2,0), (2,1), (2,2), (2,3), (2,4)$

& $x + ny + 1 = 3, 8, 13, 18, 23$ & these add to 65 ie it is a magic series

To find corresp. posns of (i, j) we need only put

$$i + ax + a'y = 2, \quad j + bx + b'y = 2$$

~~or~~ in this case say ~~$a + b$~~ $\begin{pmatrix} -2 & 3 \\ 1 & -2 \end{pmatrix}$

Put $\left.\begin{array}{l} i - 2x + 3y = 2 \\ j + x - 2y = 2 \end{array}\right\}$

(* report in Current Science)

so as to place each element of the magic series in the centre. The five sets of (x, y) give five sets of $(i, j) = (6,0), (3,2), (0,4), (-3,6), (-6,8)$

$\equiv (1,0), (3,2), (0,4), (2,1)\ (4,3)$

ie exactly the five positions obtained

May 1939: p. 298. Russell – Inside the stars – Preliminary to next month's article describing Bethe's work *

p. 338. Description of an Observatory building & dome

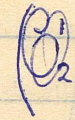
Read

June, 1939: p. 358. Relativity 25 years after – H.P. Robertson (Special theory)

p. 368. H.N. Russell – What keeps the Stars shining?
The Bethe idea that energy is supplied by atoms of one kind changing into another (and not annihilation). Source of energy is reaction between charged atomic nuclei. (& Atkinson idea)

July 1939. p. 18. H.N. Russell: What keeps the stars shining? *
According to Bethe it is atomic transformations.
The main sequence is theoretically explained. This is the most notable achievement of theoretical Astrophysics since the establishment of the relation $E = mc^2$.

Trying other knight-moves $(\pm 1, \pm 2)$ & $(\pm 2, \pm 1)$ we have the 8 cases



and using (b) the break move is given by $(1, -1)$ since posns of 25 & 1 are given. Hence the schemes for these 8 cases are

$$\begin{pmatrix} 1 & 0 \\ 2 & -3 \end{pmatrix}, \begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}, \begin{pmatrix} -1 & 2 \\ 2 & -3 \end{pmatrix}, \begin{pmatrix} -1 & 2 \\ -2 & 1 \end{pmatrix}, \begin{pmatrix} 2 & -1 \\ 1 & -2 \end{pmatrix}, \begin{pmatrix} 2 & -1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} -2 & 3 \\ 1 & -2 \end{pmatrix}, \begin{pmatrix} -2 & 3 \\ -1 & 0 \end{pmatrix}$$

✗ ✗ ✓ ✓ ✗ ✗

Of these 1st, 2nd, 6th & 8th don't give magic squares because a', a', b', b' are 0 in them. The 4th is Chakravarty's case. This leaves 3 more cases. Take for eg. the 5th. Here all condns for nasik squares are satisfied & we get (d) which is nasik. This may be called the Mathari Rao – Madhava Rao case (!!)

13	22	6	20	4
10	19	3	12	21
2	11	25	9	18
24	8	17	1	15
16	5	14	23	7

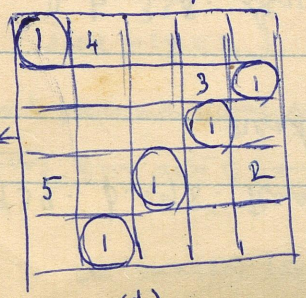
$\begin{pmatrix} 2 & -1 \\ 1 & -2 \end{pmatrix}$ (d)

The other two cases to be considered are

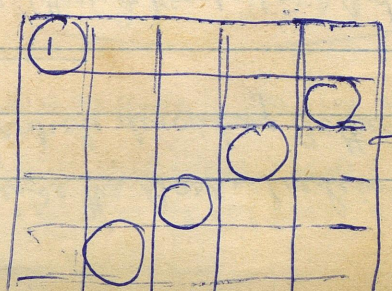
$$\begin{pmatrix} -1 & 2 \\ 2 & -3 \end{pmatrix} \text{ and } \begin{pmatrix} -2 & 3 \\ 1 & -2 \end{pmatrix}$$

In both these cases $a' - b' = 5$ ie condn for nasik not satisfied, but we might find positions of (i, j) giving 5 magic squares for each case. Of course these won't have the same lower diagonals as in (b). For these two cases the five values of (i, j) are indicated

$\begin{pmatrix} -1 & 2 \\ 2 & -3 \end{pmatrix}$



(d)



$\begin{pmatrix} -2 & 3 \\ 1 & -2 \end{pmatrix}$

(e)

p. 22. H. P. Robertson – Relativity – 20 years after (General Theory).
Reference is made to Milnes weird cosmological theory or Eddington's unholy union of quantum and relativity theories – as representing the Aristotelian method of deriving natural laws from a priori principles.

August, 1939 p. 93. Prehistoric airfoils – Aboriginal boomerangs
Very interesting article

---

p. 118. Explanation of the Schmidt Camera

Science (21/7/39): p. 10 (Science news) – Report of Paris Singer-Polignac Conference (July 17–23) to discuss novae – ignorance report of Prof. Russell's address at same on Super novae – Prof Russell Chairman & Chandrasekhar in the delegation from America

---

27/8/39: Proc. Roy. Soc. A · 172 (949) (3/8/39)

Malhari Rao's Example in J.D.M.S (Vol? No? Year?)

12	25	8	16	4
18	1	14	22	10
24	7	20	3	11
5	13	21	9	17
6	12	2	15	23

(a)

The nasik (a) is ~~given~~ constructed by the Knight's move ~~(1, 2)~~ (1, 2) and break move (0, −1). By adopting another method and using the positions of 1, 7, 13, 19, 25 as shown in square (b), fill up the vacant cells in it so as to make it nasik.

Soln (c) given by Chakrabarty B.Sc (!) using

13				
	19			
		25		
			1	
				7

(b)

13	10	2	24	16
22	19	11	8	5
6	3	25	17	14
20	12	9	1	23
4	21	18	15	7

(c)

the Knight's move (−1, −2) and the break move (1, −1)

In (a) we have $\begin{pmatrix} 1, & -1 \\ 2, & -3 \end{pmatrix}$ & since $a, b, a', b', ab' - a'b, a \pm b, a' \pm b'$ are all prime to n

we get a nasik square irrespective of the position of (i, j) ie cell containing 1.

In Chakrabarty's case we have the scheme $\begin{pmatrix} -1, & 2 \\ -2, & 1 \end{pmatrix}$ & all above condns

$q = (1, 1)$

are satisfied & we get ~~the nasik~~ Chakrabarty's nasik (c).

$a + a' = 1$
$b + b' = -1$
$3 + a + a' = 4$
$1 + b + b' = 0$
$3 + 4(a + a') = 2$
$1 + 4(b + b') = 2$
$\times 1 = (0, 4)$ $3 + 4a', 1 + 4b'$
$1, 5$ $(1, 0)$

$i +$
$3 + 2a + 2a' = 5 \equiv 0$
$1 + 2b + 2b' = -1 \equiv 4$
$(4, 2)$ $2a = -7 \equiv 3$
$a = 4 = -1$

13, 11, 6, 23, 18.
$i + 2a + 2a' = 0$
$j + 2b + 2b' = 4$
$2 - b' + 2b' = 3$

$i + 2a' = 2$
$j + 2b' = 3$
$i + a' = 0$
$j + b' = 2$
$2 - 1$
$a' = 2$
$b' = 3$
$i = 3$
$j = 1$

Proc. Imp. Acad. Japan 39, Vol. 15, No. 6.

p. 165. Yosida – Birkhoff's mean Ergodic theorem
– Mean of measure
– 2 other papers on Topology
on harmonic fns

Ap. J: July 39, p1–154. Big article by Chandrasekhar
on the Dynamics of Stellar Systems I–VIII

Book: Astronomy by W. T. Skilling & R. S. Richardson
BK || New York; Henry Holt & Co, 1939, pp. 579
$3.00
– a good review specially of the "best illustrations ever published" – very up to date – elementary

---

Physica 6. (No. 8) (Aug 39) p. 50. A. D. Fokker, Hamilton's
|| Canonical eqs for the motion of wave groups –
Shows analogy with Quant. Mech

15	8	1	24	17
3	21	19	12	10
16	14	7	5	23
9	2	25	18	11
22	20	13	6	4

Islamic B.M. with 7

$\begin{pmatrix} -1, & 1 \\ 2, & -4 \end{pmatrix}$ fails $= \begin{pmatrix} -1 & 1 \\ 2 & 1 \end{pmatrix} \therefore a'b' = 0$

18	22	1	10	14
6	15	19	23	2
24	3	7	11	20
12	16	25	4	8
5	9	13	17	21

Fig (43)

D.B.M with $\begin{pmatrix} 2, & -2 \\ -1, & -1 \end{pmatrix}$ → works

See Annals of math Vol. 37, p. 326

Vol. 35, p. 658.

for work of K.S.K on Tr. of sequences & Hermite Sequence etc

Try & get (2, 0) & (−2, 0) with knight moves.

B.M (2,0)

25	13	1	19	7
16	9	22	15	3
12	5	18	6	24
8	21	14	2	20
4	17	10	23	11

$\begin{pmatrix} 1, & 1 \\ 2, & -2 \end{pmatrix}$

↱ → works. – Nasik not A.

Fig (45)

B.M (−2,0)

7	19	1	13	25
11	23	10	17	4
20	2	14	21	8
24	6	18	5	12
3	15	22	9	16

$\begin{pmatrix} -1, & -1 \\ -2, & 2 \end{pmatrix}$

↲ ← works – Nasik not A

Fig (46)

J. app. Phys. Aug. 39

p. 525. Shall we kill the goose that lays the golden eggs – Criticises those who blame physicists specially modern theoretical physicists

---

Bk. Hydro & aero-dynamics by S. L. Green; Pitman.

Science (28/7/39) p. 85. Report of Symposium on Galactic structure in connection with dedication of McDonald Observatory of Texas – Very int. report. Oort, Russell, Kuiper – mention of Russell's new mass-luminosity relation (in solar units):

$$\text{Log } L = 3.82 \log m - 0.24$$

Dr Kuiper mentions sub-dwarfs – Oort on finding spiral structure – Dr Chandrasekhar's paper said to revolutionise stellar dynamics – Milne's lecture on cosmological theories

---

Nature (5/8/39) p. 234. Donnan's most wonderful tribute to Baron Joji Sakurai.

$\begin{pmatrix}1,-1\\2,-3\end{pmatrix}$

7	20	3	11	24
13	21	9	17	5
19	2	15	23	6
25	8	16	4	12
1	14	22	10	18

Fig. 49.
Nasik (not A as it is)

$\begin{pmatrix}1,-1\\2,-3\end{pmatrix}$

1	14	22	10	18
7	20	3	11	24
13	21	9	17	5
19	2	15	23	6
25	8	16	4	12

Fig. 48.
Nasik not A (as it is)

X

17	24	1	8	15
10	12	19	21	3
23	5	7	14	16
11	18	25	2	9
4	6	13	20	22

Islamic break move with ↱ fails

$\begin{pmatrix}1,-1\\2,-4\end{pmatrix}$ " ↱ "

$\equiv \begin{pmatrix}1,-1\\2,1\end{pmatrix}$

$\begin{pmatrix}1,-1\\-2,0\end{pmatrix}$

X

11	6	1	21	16
4	24	19	14	9
17	12	7	2	22
10	5	25	20	15
23	18	13	8	3

Islamic break move with ↳ ~~works~~ fails in rows because

Seventweek Ch. 208 Nos. 21, 22, 26
in 209. No. 5

17/10/39 : Comptes Rendus. t. 208. No. 20 (15/5/39).

p. 1573. F. Perrin : Transmutation in chain of Uranium

No. 21, p. 1630. J. Mariani : Principle of duality & representation of elementary particles – mentions duality of notions of distance & angle, point & tangential coords ; x to p – mentions Born's reciprocity paper – states that in wave eqns & commutability relations x & p play symmetric roles – gets for the wave eqn the form

$$\frac{h}{2\pi i}\frac{\partial \rho}{\partial t} + \frac{\partial \rho}{\partial x^i}\frac{dx^i}{dt} + \frac{\partial \rho}{\partial p_i}\cdot\frac{dp_i}{dt} = [\rho, H] = \rho H - H\rho + \frac{\partial \rho}{\partial t} + (H + H')\rho = 0$$

No. 22 : p. 1697. L de Broglie – Case of reducibility in wave mechanics of particles of spin 1.

Ref to Actualité series book "Une nouvelle théorie de la lumière" The general eqns reduces to 15 of Maxwellian type & 16 of non-Max. type (for latter refers to Klein's lectures at Poincaré Inst. Applies these eqns to cases of spin $j = 0$, $j = 1$ & examines results

---

p. 1709. G. Petiau – on same topic

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

18	15	7	4	21
6	3	25	17	14
24	16	13	10	2
12	9	1	23	20
5	22	19	11	8

Islamic method with regular move replaced by Knight's move ⟶↑. same break move (associated, Andrews fig 13 p. [illegible])

Fig. ~~[illegible]~~ (51)

8	11	19	22	5
20	23	1	9	12
2	10	13	16	24
14	17	25	3	6
21	4	7	15	18

Western method with only regular move replaced by ⟶. Associated. Andrews, fig. 13, p. 10.

$$\begin{pmatrix} -2, & 2 \\ -1, & 3 \end{pmatrix}$$

Fig ~~[illegible]~~ Fig (52).

mention two cases $n = 5$, $n = 7$ with regular advance & break move both knight's moves – Cf. with Knight's tour problem of $n = 8$.

⟶ ↓

$$\begin{pmatrix} 1, & -1 \\ 2, & -3 \end{pmatrix}$$

nasik

not associated

if I be at (2,4) becomes associated

24	7	20	3	11
5	13	21	9	17
6	19	2	15	23
12	25	8	16	4
18	1	14	22	10

Fig (50)

7	23	14	5	16
13	4	20	6	22
19	10	21	12	3
25	11	2	18	9
1	17	8	24	15

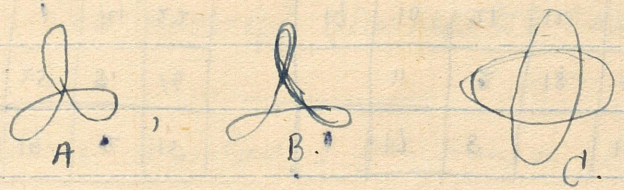
X $\begin{pmatrix} 2, & -2 \\ 1, & -3 \end{pmatrix}$

No. 23 : p. 1773. J. Devisme – Geometry of space whose metric is

$$ds^3 = dx^3 + dy^3 + dz^3 - 3\,dx\,dy\,dz$$

---

p. 1775. A. Vazsonyi – Topological characterisation of plane continua of order four – Proves that they are all exhausted by those homeomorphic with the whole or part of curves below



---

p. 1780. S. Mandelbrojt – Remarkable property of functions indefinitely differentiable

Fund. Theorem : Every such fn in a closed interval $[a, b]$ is, in the open interval, (a, b), the sum of two functions of the strongly quasi-analytic type.

mentions H. Cartan & Allies to K.S.K's work

---

p. 1795 : J. Solomon – Magnetic moment of proton. Explains the difference in values obtained by

All these cases start with 1 in centre of top row. We might consider other positions of the starting point. Taking this to be the centre of the square, with a regular advance by the knights move Γ.

* These are roots of eqn

$$f^{(m-2)}(x) = \frac{1}{2}(m-2)!\,(m-2)\left[(m-1)p^2 - 2mq\right]$$

or of

$$mx^2 + 2px = (m-2)p^2 - 2(m-1)q.$$

And the usual break move of one cell down give the magic square in Fig. 44 which is, however, not associated.

Γ

$\begin{pmatrix} 1, & -1 \\ 2, & -3 \end{pmatrix}$

23	6	19	2	15
4	12	25	8	16
10	18	1	14	22
11	24	7	20	3
17	5	13	21	9

Fig 47 (also nasik not associated)

$\begin{pmatrix} 2, & -2 \\ -1, & 2 \end{pmatrix}$

1	17	8		15
	11	2	18	9
19	10	21	12	3
13	4	20	6	23
7		14	5	16

X

$\begin{pmatrix} 1, & -1 \\ -2, & 1 \end{pmatrix}$

1	20	9	23	12
7	21	15	4	18
13	2	16	10	24
19	8	22	11	5
25	14	3	17	6

X Lower diagonal

$\begin{pmatrix} -1, & 3 \\ -2, & 4 \end{pmatrix}$ −4 56

1	8	15	17	24
20	22	4	6	13
9	11	18	25	2
23	5	7	14	16
12	19	21	3	10

break move extended knights move Γ

[nasik, not associated]

Fig 53

the methods of Stern and Rabi, by considering the magnetic moment on the mesotron theory – ~~[illegible]~~.

---

p. 1812. G. P. Dube & S. Levine – Math. paper on colloid particles

---

No. 24: p. 1864. A. Gorny – maxima of successive derivatives – refers to work of Cartan & Mandelbrojt & Kolmogroff (No. ref. to K. S. K)

No. 25. p. 1958. C. Nicolau – A theorem on algebraic eqns – Show that if an eqn

$$f(x) = x^m + px^{m-1} + qx^{m-2} + \dots = 0$$

Int | has all its roots real and distinct, they are comprised between

$$\left[-p \pm \left\{(m-1)^2 p^2 - 2m(m-1)q\right\}^{1/2}\right]/m^*.$$

The author has proved this before for $m=3$ (Annales de l'Univ de Jassy 18, 1932) & now generalises it here. Method is that of math. induction (Can one get a direct proof?)

---

p. 1965. H. Villat on the space attached to the form Δ_3 Vide Devismes paper.

24	15	1	17	8
5	16	7	23	14
6	22	13	4	20
12	3	19	10	21
18	9	25	11	2

Fig. 42

This works. Vide Andrews. Fig. 13, p. 10. All other knight moves except ⌐ & ⌐ work & give associated squares. (Mention this with only one Fig)

$\begin{pmatrix} 2, & -2 \\ -1, & 0 \end{pmatrix} \times$ $\begin{pmatrix} -2, & 2 \\ -1, & 0 \end{pmatrix} \times$

12	9	1	23	20
5	22	19	11	8
18	15	7	4	21
6	3	25	17	14
24	16	13	10	2

~~Fig 43~~ ~~Fig 43~~
Islamic break move fails
$\begin{pmatrix} 2, & -2 \\ 1, & -3 \end{pmatrix}$ semi-magic

18	22	1	10	14
5	9	13	17	21
12	16	25	4	8
24	3	7	11	20
6	15	19	23	2

$\begin{pmatrix} 2, & -2 \\ 1, & 1 \end{pmatrix}$

not associated (nasik)

Western Break move works
Fig. ~~44~~ 44

25	13	1	19	7
5	18	6	24	12
10	23	11	4	17
15	3	16	9	22
20	8	21	14	2

X ~~Fig 45~~ - B.M. (2, 0) ~~[illegible]~~
(~~not associated~~).
$\begin{pmatrix} 2, & 0 \\ 1, & -1 \end{pmatrix}$ fails ∴ $a' = 0$.

7	19	1	13	25
5	12	24	6	18
23	10	17	4	11
16	3	15	22	9
14	21	8	20	2

B.M. (−2, 0) X
$\begin{pmatrix} 2, & -4 \\ 1, & -1 \end{pmatrix}$ semi-magic

Very interesting properties – introduce the sphere of Appell whose eqn is $x^3+y^3+z^3-3xyz=a^3$

& mentions a theory analogous to poles and polars & notion of harmonic division of ~~the line~~ segment AB by P_1, P_2, P_3 according to

$$\frac{1}{AP_1}+\frac{1}{AP_2}+\frac{1}{AP_3}=\frac{3}{AB}.$$

No. 26. p. 2057: E. C. G. Stueckelberg – Elimination of the ∞ in quantum electrodynamics & the mass of elementary particles –

Ref. Heisenberg – Z. f. Phys. 110, 1938, 251 (introduction of l)

Stueckelberg – Helv. Phys. Acta, 9, 1936, 389
11, 1938, 225 & 299

Dirac – Proc. Roy. Soc. 155, 1936, 447

Fierz – Helv. Phys. Acta, 12, 1939, p. 3.

Complicated paper. ~~Cl be read~~ uses analytic continuation – additional coords – removal of singularities etc

---

p. 2059: F. London – Refers to paper of Krishnan & Seshan.

There is no need to consider Bachet's method since the regular move is the same ↑ as in I.D. and along with this the four cases $(\pm 2, 0)$, $(0, \pm 2)$ ~~has~~ already considered give same results.

We have to indicate which of the several cases of the I.D. & Islamic methods which give associated squares

I.D – $(2,0)$ only case $(i,j) = (3,2)$ – associated

$(0,2)$ " " $= (2,3)$ – associated ≡ Bachet's case.

$(-2,0)$ – five cases at $(4,0), (0,1), (1,2), (2,3), (3,4)$ – $(i,j) = (1,2)$ is associated.

$(0,-2)$ – five cases " $(0,4), (1,0), (2,1), (3,2), (4,3)$ – $(i,j) = (2,1)$ is associated

Islamic method – $(2,0)$ only case at $(i,j) = (3,2)$ – associated

$(0,2)$ five cases at " $= (0,0), (1,4), (2,3), (3,2), (4,1)$ one at $(2,3)$ is associated

$(-2,0)$ five cases " $= (0,3), (1,2), (2,1), (3,0), (4,4)$, one at $(1,2)$ is associated

$(0,-2)$ only case at $(i,j) = (2,1)$ associated

Note – In all cases of associated squares (i,j) is in the central row or central column.

Similarly in the five cases on p. 12 for $n=5$ & p. 19 for $n=7$, the associated squares are only the usual ones with (i,j) being middle of top row ie in central column.

These must be included before the § on Knight's moves.

Re. Knight's move: first take ↑ as regular move & ↓ as break move

P.T.O

Ibid. t. 209. No. 1 (3/7/39)

No. 4. p. 194. G. Petiau – wave eqn of a corpuscle with two states representing proton - neutron

---

No. 5. p. 266. L de Broglie – on the theory of particles of arbitrary spin. – Shows that his results are in accord with the work of Fierz (Uber die relat. Theorie Kraftfreier Teilchen mit beliebigem Spin, Bâle, 1939) by considering in particular two particles of spin 1 combining into one of spin 2.

No. 6. p. 337. Amin Yasin Amin – on a geometrical method of obtaining 991 out of the 2015 conics of contact of a plane quintic curve

---

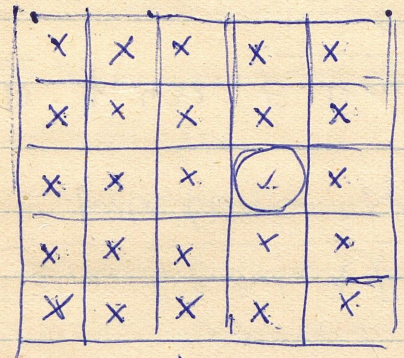
p. 340. G. P. Dube & H. K. Dasgupta – On the London-van der Waals force between 2 particles in disc forms

---

No. 10: p. 432. E. Levine – on the protidons – What kind of new particles?

Slamic method

(2, 0)

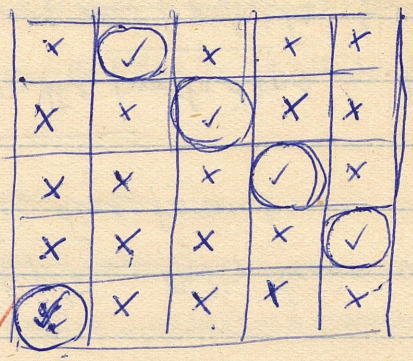


×	×	×	×	×
×	×	×	×	×
×	×	×	✓	×
×	×	×	×	×
×	×	×	×	×

$\begin{pmatrix} 1 & , & 1 \\ -1 & , & 1 \end{pmatrix}$ — only case just as in O.D.

1 + 11 + 16 + 21 + 6 ×
2 + 7 + 12 + 17 + 22 ×
3 + 8 + 13 + 18 + 23 = 65 ✓
4 + 9 + 14 + 19 + 24 = 70 ×
5 + 10 + 15 + 20 + 25 = 75 ×

(0, 2)



×	✓	×	×	×
×	×	✓	×	×
×	×	×	✓	×
×	×	×	×	✓
✓	×	×	×	×

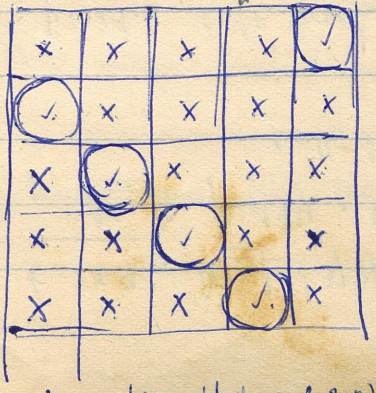
$\begin{pmatrix} 1 & -1 \\ -1 & , 3 \end{pmatrix}$

2 + 9 + 11 + 25 + 18 = 65 | 3 + 10 + 12 + 19 + 21 = 65 ✓
1 + 8 + 15 + 24 + 17 = 65 | 4 + 6 + 13 + 20 + 22 = 65
5 + 14 + 16 + 23 + 7 = 65 ✓ Five cases being reflections of (0, −2) of O.D. in horizontal line through centre.

The case (0, −2) gives as seen earlier a single case. So the only case left over is (−2, 0).

$\begin{pmatrix} 1 & , -3 \\ -1 & , 1 \end{pmatrix}$
$a + b = 0$

(−2, 0)



* Extract for "Current Science"

×	×	×	×	✓
✓	×	×	×	×
×	✓	×	×	×
×	×	✓	×	×
×	×	×	✓	×

1 + 8 + 15 ×
5 + 7 + 14 + 16 ×
2 + 9 + 11 + 18 + 25 = 65 ✓
3 + 4 + 10 + 12 + 19 + 21 = 65 ✓
4 + 6 + 13 + 20 + 22 = 65 ✓
5 + 14 + 16 + 23 + 7 = 65 ✓
1 + 8 + 15 + 17 + 24 = 65 ✓

5 cases being reflection of (−2, 0) of O.D. method

J. Franklin. Inst. August 1939

Rev*

p. 131. Hubble – Motion of galaxy among the nebulae

p. 143. H.N. Russell – Stellar energy – is a brilliant exposition of Bethes recent work (Phys. Rev. 55, 434, 1939)

p. 183. W.F. Durand – outlook in fluid mechanics – A comprehensive survey of modern developments.

Naturwiss: Heft. 32 (11/8/39) p. 550. Ertel & Kolhörster – on the mean free path measurements.

27/12/39 (after 2½ months): Proc. Phys. Math. Soc (Japan), Vol 21, No 8. p. 475 – Bose-Einstein condensation – Liquid helium as a Bose-Einstein assembly.

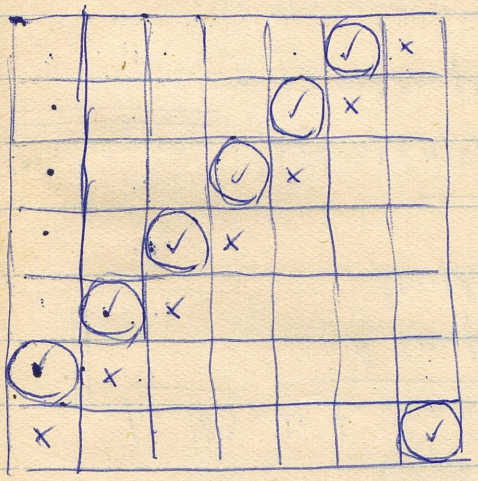
Monatshefte f. Math u. Phys. 47 Bd. 4 Heft. p. 333.

F. Schoblik: Über eine Funktionalbeziehung Hermitescher Polynome.

I suppose there is no need to go to the case $n = 7$. Anyway let us test one or two cases say (i) where there are 5 possibilities, and (ii) where there is only one possibility. Test $(2,0)$ & $(-2,0)$

[* good for symposium]

B.M = $(-2,0)$



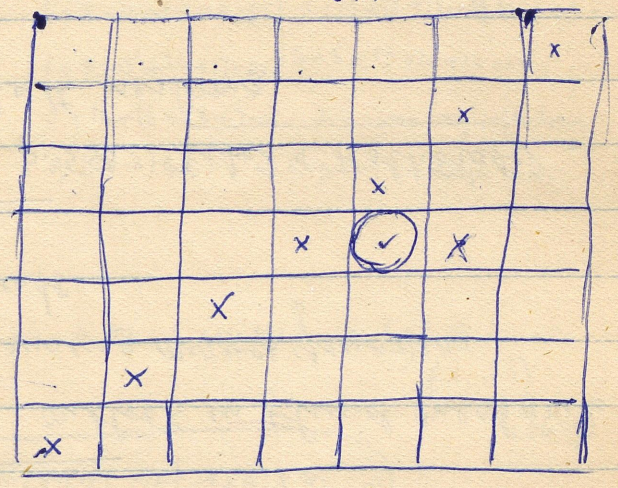
$n = 7$ ✓ (?)

$1+10+28+30+39+48+59$
$= 175$ ✓

$7+18+27+29+38+47+9 = 175$ ✓

$2+11+22+31+40+49+20 = 175$ ✓

B.M = $(2,0)$



~~7+14+21+28~~ Try cell to right of centre – this works. ✓ (?)

$4+11+18+25+39+32+46 = 175$ ✓

Similarly with $(0,2)$ works being Bachet's case

$(0,-2)$ perhaps works analogous to $(-2,0)$

We should also consider the cases $(-2,0)$, $(0,-2)$, $(2,0)$ & $(0,2)$ for the Islamic as well as the Eastern methods – ~~(0,2)~~ ~~(0,-2)~~ we have done $(0,2)$ which is Bachet's case. Let us try all these cases only for $n = 5$.

Kampé de Feriet has proved

$$\frac{(a_1^2+a_2^2)^{n/2}}{n!}\cdot H_n\left(\frac{a_1x_1+a_2x_2}{\sqrt{a_1^2+a_2^2}}\right)=\sum_{\nu=0}^{n}\frac{a_1^{\nu}a_2^{n-\nu}}{\nu!\,(n-\nu)!}H_\nu(x_1)\cdot H_{n-\nu}(x_2).$$

& of an with Appell for the 2-Dimensional case ~~H~~ $\times H_{mn}(x,y)$.
Author extends these & gives alternative proofs

---

p. 388. T. Y. Thomas: Decomposition of Riemann spaces in the large.
– Ref. to Duschek-Mayer – Elem. viewpoint

J. of Sc. Hiroshima Univ. Vol 9, No. 3. Aug 39: p. 157. T. Ogasawara –
Relation between intuitionistic logic & lattice.

---

p. 166. T. Sibata – Spinor Calculus
p. 195. H. Takeno – Cosmology with Born-type Electromagnetism
p. 217. Mimura & Hosokawa – Space, Time & Laws of nature* – An interesting discussion leading to the wave geometry of the Japanese School

---

J. of Math & Phys. Vol 18, No. 2, May 1939
The Light-field by A. Gershun – Translation

We find that there are 5 cases for choice of 1 which succeed. So even for $\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$ there may be positions of 1 for which the method works.

		3		9
	2		8	
1		7		
	6			5
			4	

B.M = (2,0)

× 3	× 16	× 9	× 22	× 15
× 20	× 8	× 21	× 14	× 2
× 7	× 25	× 13	1 ✓	× 19
24 ×	× 12	5 ×	18 ×	6 ×
× 11	4 ×	17 ×	10 ×	23 ×

3 + 8 + 13 + 18 + 23

2 + ×

11 + 12 + 13 + 14 + 15

(associated)

We see that there is just one case with 1 in the cell (3,2). ~~Before~~

$(i + \xi + \xi', j + \xi - \xi')$ ~~(i+x+y, j+x-y)~~ , $x + ny + 1$

Again try breakmoves (−2,0), (0,2) & (0,−2) keeping diagonal move intact of O.D.M.

B.M = (−2,0)

×	×	×	✓	×
×	×	✓	×	×
×	✓	×	×	×
✓	×	×	×	×
×	×	×	×	✓

B.M = (0,2)

×	×	×	×	×
×	×	✓	×	×
×	×	×	×	×
×	×	×	×	×
×	×	×	×	×

B.M = (0,−2)

✓	×	×	×	×
×	×	×	×	✓
×	×	×	✓	×
×	×	✓	×	×
×	✓	×	×	×

$\begin{pmatrix} 1 & -3 \\ 1 & -1 \end{pmatrix} \to$ 5 cases marked

$1 + 8 + 15 + 17 + 24 = 65$ ✓

$11 + 12 + 13 + 14 + 15 = 65$ ✓

$2 + 9 + 11 + 18 + 25 = 65$ ✓

$5 + 7 + 16 + 14 + 23 = 65$ ✓

$3 + 10 + 12 + 19 + 21 = 65$ ✓

Bachet's case — only one sol. (see p. 24)

$1 + 6 + 11 + 16 + 21 = 55$ ×

$5 + 10 + 15 + 20 + 25 = 75$ ×

$\begin{pmatrix} 1 & -1 \\ 1 & -3 \end{pmatrix} \to$ 5 cases

$5 + 7 + 14 + 16 + 23 = 65$ ✓

$3 + 10 + 12 + 19 + 21 = 65$ ✓

$2 + 9 + 11 + 18 + 25 = 65$ ✓

$4 + 6 + 13 + 20 + 22 = 65$ ✓

$1 + 8 + 15 + 24 + 17 = 65$ ✓

of the book by P. Moon & G. Zimoshenko. To obviate the "arrested development" of theoretical photometry which is stationary since 1760. Suggested a rich field for mathematicians. Scope for using tensor analysis in a 5-dimensional manifold

---

ibid: July, 39, p. 153. L. F. Epstein – π related to series for e^{e^x}

p. 202. F. L. Hitchcock. Alg. Eqn with complex coeffs

22/5/40 (after 5 months!).

Sc. Papers of Inst. Phys & Chem research (Japan) Nos. 955-57

Feb. 1940, Vol 37.

p. 114. I. Nitta – on optical anisotropy of molecular crystals – The problem that Friedel & Born was here.

Amsterdam Proc. Wetensh. Vol. 43 (1901). p. 91

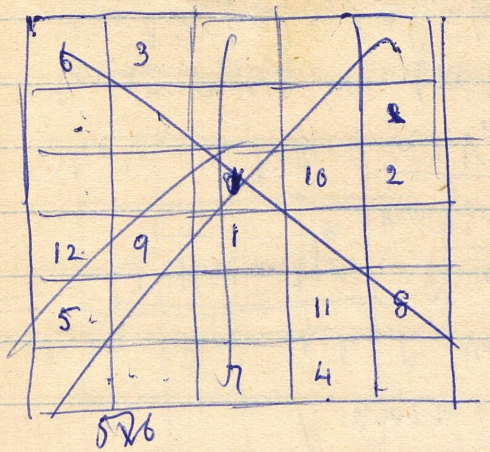
J. Haantjes: Eine Charakterisierung der konformeuklidischen Räume:

The V_n is taken as V_{2m} & necessary & sufficient conditions are given for conformality to a S_n. Ref. to earlier paper & also paper Schouten & Struik.

↑ & Islamic method. ↓ −2

6	3			
				2
		1	10	2
12	9	1		
5			11	8
		7	4	

5×6



6	3	25	17	14
24	16	13	10	2
12	9	1	23	20
5	22	19	11	8
18	15	7	4	21

X lower diagonal

On p. 6 of main book on magic squares, we have a magic square with 1 in the centre which is regular, obtained by the regular move ⌐ and break move of Ind. diag. method. This is forbidden on Andrews. The above works because sq. not ~~appr~~ a priori assumed associated

$\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$ $\left.\begin{matrix} a+a'=2 \\ b+b'=0 \end{matrix}\right\}$

1	19	7	25	13
18	6	24	12	5
10	23	11	4	17
22	15	3	16	9
14	2	20	8	21

X

25	13	1	19	7
12	5	18	6	24
4	17	10	23	11
16	9	22	15	3
8	21	14	2	20

This is because Rouse-Ball's general method does not give when the diagonals are magic when $a, b, a', b', ab'-a'b$ are prime to n. In fact for $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$ (fails ∵ $a-b=0$).

ibid No. 2. p. 159 & p. 168. Weitzenböck: Affine invariants bei Kegelschnitten und Affinegeometrie der F_2 im R_3

p. 224 & 240 → 2 papers by Feldheim on Hermite and Laguerre polynomials (Will Sastry to Read)

ibid No. 3: p. 379 – Third article by Feldheim

J. Franklin Inst Jan. 1940. p. 21. S. A. Korff: Solar influence on cosmic ray intensity at high elevations. – Supports Vallarta's theory of effect of Sun's magnetic field

ibid Feb. 46

" Mar 40. p. 281. Report by Swann on Cosmic rays

Comptes Rendus. t. 210. No. 1.

p. 39. Poporici – Age of the solar system

No. 3, p. 90: Châtelet: Exceptional points of a Weierstrass cubic, $y^2 = x^3 - Ax - B$ $(4A^3 - 27B^2 \neq 0)$

-4 +1 = -3 (6)

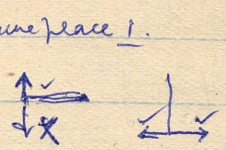
Knights moves:

$a+a'=0$
$b+b'=-1$.

(1) S.D. method – regular move = knights move, knight move = same.

$\begin{pmatrix} a & a' \\ b & b' \end{pmatrix} = \begin{pmatrix} 2 & -2 \\ 1 & -2 \end{pmatrix}$ ✓

same place !.



$\begin{pmatrix} 2 & -2 \\ -1 & 0 \end{pmatrix}, \begin{pmatrix} 1 & -1 \\ 2 & -3 \end{pmatrix}$ ✓

$\begin{pmatrix} -2 & 2 \\ 1 & -2 \end{pmatrix} \begin{pmatrix} -2 & 2 \\ -1 & 0 \end{pmatrix}$ ✗

$\begin{pmatrix} -1 & 1 \\ 2 & -3 \end{pmatrix}$ ✓

$\begin{pmatrix} 1 & -1 \\ -2 & 1 \end{pmatrix} \begin{pmatrix} -1 & 1 \\ -2 & 1 \end{pmatrix}$

According to Andrews associate square. Fig 13, p. 10, shows that

ie $\begin{pmatrix} 2 & -2 \\ -1 & 0 \end{pmatrix}, \begin{pmatrix} -2 & 2 \\ -1 & 0 \end{pmatrix}$ don't work and $a+a'=0$ with $b+b'=-1$ where over $ab'-a'b =$ primitive.

Work these two cases in full also in Andrews method

6	16	1	11	21	✗
12	22	7	17	2	✗
18	3	13	23	8	✓
24	9	19	4	14	✗
5	15	25	10	20	✗
✓	✓	✓	✓	✓	

24	9	19	4	14
5	15	25	10	20
6	16	1	11	21
12	22	7	17	2
18	3	13	23	8

Same thing repeat here.

Taking 1 in (2,4) is same as both methods. Try 1 in the centre of the square and walk some other K. Move

12	3	19	10	21
18	9	25	11	2
24	15	1	17	8
5	16	7	23	14
6	22	13	4	20

~~Correct although this is not a proper method~~

Fails in upper diagonal – why?

compos^{n} of 2 pts. w.r.t this comp^{n} points of C whose coordinates are numbers of an algebraic field (finite) K containing A and B form an abelian group G(C, K) — Theorems relating to these sorts of ideas

---

No. 4, p. 131, C. Oramba : 3 body problem of plane isos. Δ^{le}

---

p. 138. Further note by Popovici on age of solar system.

---

p. 168. Roubaud-Valette — Wave mech. of certain "espace tordus"

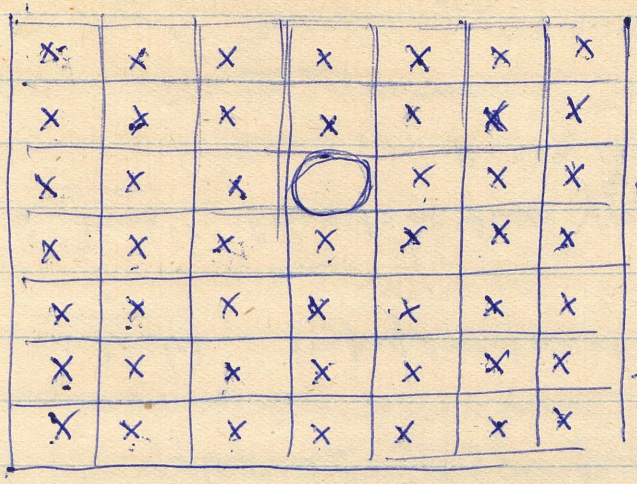
Talks of Dirac matrices $I_\mu^2 = +1$ or Neumann matrices $I_\mu^2 = -1$ & considers $I_\mu^2 = \lambda$.

No. 5. p. 200. Châtelet — groups of encephaal pts on cubics

No. 8. p. 284. G. Fano — Remarks on Amin Yasin's paper (C.R. 209, 1939, p. 337)

---

p. 288. Kerékjarto — Inversions of commutative group



118

13 + 20 + 34 + 48 + 27

6 + 13 + 20 + 27 + 34 + 41 + 48 = 189

2 + 9 + 16 + 23 + 30 + 37 + 44 = 161 ×

5 + 12 + 19 + 26 + 33 + 40 + 47 = 182 ×

1 + 8 + 15 + 22 + 29 + 36 + 43 = 154 ×

4 + 11 + 18 + 25 + 32 + 39 + 46 = 175 ✓ ; 3 + 9 + ... + 14 = ×

3 + 10 + 17 + 24 + 31 + 38 + 45 = 168 ×

7 + 14 + 21 + 28 + 35 + 42 + 49 = 196 ×

$a + (a+7) + (a+14) + (a+21) + (a+28) + (a+35) + (a+42) = 7a + 147$

$7a + 147 = 175 ; 7a = 28 , a = 4$

4 + . . . = ✓ , 29 + 30 + 31 + 32 + 33 + 34 + 35 = 224 ×

So even for Bachet's method for n = 7 there is the only case.

Ibid. No. 11, p. 393. Dramba – 3 body problem (cont'd)

No. 12, p. 431. H. Cartan – Maxima of successive derivatives of a fn –

Ref. to Cartan – C.R. 208, p. 555 & 716

Also Mandelbrojt & Cartan – Acta Math

Ref to Carleman –

– I.C.I.C to refer to these papers

Encl Brit Article Summary 1973 1960

No. 13 p. 477 J. Solomon – on theory of the deuteron

Ref. to Belinfante's: Theory of heavy Quanta and A.H. Wilson's paper in Proc. Camb. Phil Soc, 34, 1938, p. 365

No. 15, p. 525. Laurent-Schwartz – on a property of the fn $m(r, A)$ of Nevanlinna in meromorphic fns

---

Ann. Soc. Sc. de Bruxelles t. 59 (1939) Sr. I. (31/12/39)

p. 347. M.V. Thébault: Geom of Δ^h & tetrahedron

$\begin{pmatrix} 1, & -1 \\ -1, & -1 \end{pmatrix}$

So it looks as if the curious Islamic method unlike the I.D. method ie it gives an associated square for only one position viz $(m, m-1)$ $(n = 2m+1)$

This ~~requ~~ can perhaps be explained.

Let us finally test Bachet's western method ie $\begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$

$a + a' = 0$
$b + b' = 2$

* ie a +ve integer (71) the numbers of whose positive integral divisors is greater than that of every smaller +ve integer. First five highly composite numbers are 2, 4, 6, 12, 24.

$11 + 12 + 13 + 14 + 15 = 65$
$(3 + 8 + 13 + 18 + 23) = 65$

x	x	x	x	x
x	x		x	x
x	x	x	x	x
x	x	x	x	x
x	x	x	x	x

$5 + 10 + 15 + 20 + 25 = 75$ X

$2 + 7 + 12 + 17 + 22 = 60$ //

$4 + 9 + 14 + 19 + 24 = 70$ X

$1 + 6 + 11 + 16 + 21 = 55$ X

Here again only one case like the Islamic method

Note: In the I.D. method only one diagonal has 11, to 15 for $n = 5$ & 22 to 28 for $n = 7$, but the other permissible diagonals do not have elements in ~~the~~ a single A.P. like the Islamic & western methods. This makes it easier to check up in the latter two cases

ibid. t. 60. (1940). (9/3/40). p. 5. M. V. Thébault - Re Similar rectangles associated with a triangle

---

p. 45. Bernard Mannebach & Verleysen: Potential fn of plane movements of the Benzene molecule — Ref to previous paper of Lemaitre, Mannebach & Tchang which Dayal ref enquired about

---

Trans. Roy. Soc. Canada. 3rd Se. Vol 38, May 39, p. 11

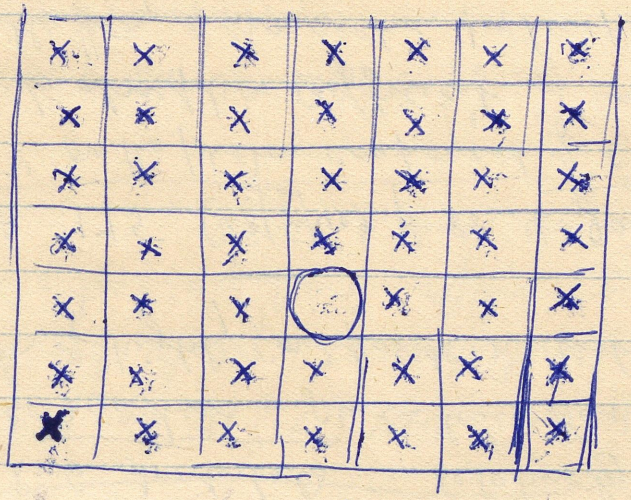
R. G. Archibald — Relatively highly Composite numbers — generalises Ramanujan's defn of highly composite numbers*

Proc. Roy. Soc A. 175, (28/3/40). p. 88. L. Jánossy & B. Rossi. 'on the photon component of cosmic radiation & its absorption coefficient — Conforms Bethe-Heitler theory of cross section for pair production by high energy photons and also of the prediction of the cascade theory of Bhabha & Heitler as extended by Arley. (unpublished numerical results)

Certainly a striking result viz that in the Islamic method the only possible case is the ~~symmetric one~~ associated one with 1 in (2,1) — No need to go to 7 — Shall we? yes.

15 + - + 21

15	22
16	23
17	24
18	25
19	26
20	27
21	28
6	175



This helps the picking up easily

n = 7 Islamic case

only consecutive nos adding to 175 are 22 + - - + 28

& nos with A.P. with C.D = 7 are 4 + 11 + 18 + 25 + 32 + 39 + 46 = 175

1 + 8 + 15 + 22

8 + 15 + 22 + 29

+ 36 8 + 36 + 42 + 49

+ 1 + 15 + 29

+ 22

154 ~~179~~

2 + 9 + 16 + 23 + 30 + 37 + 44 = 161

7 + 14 + 21 + 28 + 35 + 42 = 147

2 + 9 + 16 + 23 + 37 + 44 + 30 = 161 ✗

6 + 27 + 34 + 41 + 48 + 13 + 20 = 189 ✗

4 + 11 + 18 + 25 + 32 + 39 + 46 = 175

7 + 14 + 21 +

7 + 14 + 21 + 28 + 35 + 42 + 49 ✗

3 + 10 + 17 + 24 + 31 + 38 + 45

5 + 12 + 19 + 26 + 33 + 40 + 47 = 182

4 + 11 + 18 + 25 + 32 + 39 + 46 = 175

2 + 9

Proc. Nat. Acad. Sci Vol. 26 (Feb. 40). p. 148.

H. Whitney – Theory of Sphere bundles (Topology) – fibre bundles etc

---

Proc. Imp. Academy (Japan) : Vol 15, No. 5, May 39

p. 116. K. Yano – Sur la connexion de Weyl-Hlavaty et la géométrie conforme

---

Ap. J. March 1940. p. 215. Breit & Zeller – Metastables of H and He.

---

p. 239. Marshak & Bethe – Generalised Thomas-Fermi method as applies to stars – Shows Thomas-Fermi method is quite feasible for the dense red dwarfs and the subdwarfs (recently discovered : See G.P. Kuiper, Ap. J, 89, 1939, 548)

---

p. 257 : V. Rojansky – Hypothesis of the existence of contraterrene matter

13	21	9	17	5
1	14	22	10	18
19	2	15	23	6
7	20	3	11	24
25	8	16	4	12

(0,3) X

24	7	20	3	11
12	25	8	16	4
5	13	21	9	17
18	1	14	22	10
6	19	2	15	23

(1,1) X

12		8	16	4
5	13	21	9	17
18	1	14	22	10
6	19	2	15	23
24	7	20	3	11

(1,2) X

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

(1,4) X

14	22	10	18	1
2	15	23	6	19
20	3	11	24	7
8	16	4	12	25
21	9	17	5	13

(4,4) X

21	9	17	5	13
14	22	10	18	1
2	15	23	6	19
20	3	11	24	7
8	16	4	12	21

(4,3) X

8		4		
	9		5	
		10		1
2			6	
	3			7

(4,2) X

20	3	11	24	7
8	16	4	12	25
21	9	17	5	13
14	22	10	18	1
2	15	23	6	19

(4,1) X

only consecutive nos totalling 65 are 11+12+13+14+15 = 65

only in nos A.P with C.D = 5 are 9+8+13+18+23 = 65

This helps summing the two diagonals easily

"Contraterrene" means atoms with -vely charged nuclei and extranuclear members are positrons - author considers some on this speculative notion and astrophysical implications - Ref. to Dirac (De Moderne Atoomtheorie: p45) Gamow, p. 14, V. Rojansky: Phy. Rev. 48, 108, 1935

Ann. del'Inst. Poincaré. Vol 9, Fasc. 2

Dirac - on his new electron theory - Also makes attempts at quantisation using the notion of the Weutzel field

---

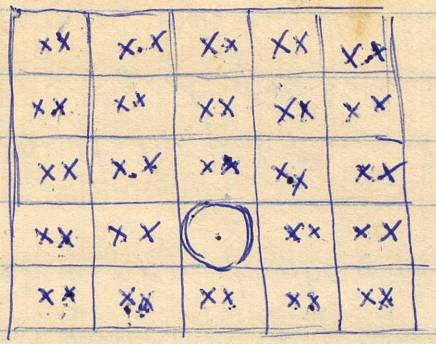
7/7/40. Amsterdam Proceedings: Vol. 43 No. 4

p. 532: H. P. Berlage: Spontaneous development of a gaseous disc revolving round the sun into rings and planets. - Shows that such a disc has the characteristic of an embryo of the planetary system

---

Comptes Rendus: t. 210, p. 652. Note on upper limit of roots of a polynomial

p. 654 - Note by P. Montel on the same



16+17+18+19+20

××	×.×	×.×	××	×.×
××	××	××	××	××
××	×.×	××	×.×	××
××	××	.	××	××
××	××	××	××	××

6 + 11

16 + 17 + 18 + 19 + 20

5 + 10 + 15 + 20

2 + 7 + 17 + 22 + 12 ×

11 + 12 + 13 + 14 + 15 ✓

~~2+7+15+19+24~~

~~11+ ... +15~~ 5 + 15 + 20 + 25 + 10

11 + ... + 15 ✓

~~5+10+15~~

~~4+9+14~~ 9 + 14 + 19

~~6+11+16~~

4 + 14 + 19 + 24 + 9

~~2+~~ ~~6+11+16+21~~

~~9+21~~ ~~2+3+8+13~~ 2+7+12

3+8+13 17+7+12

only one case?

appears rather a doubtful result.

$\begin{pmatrix} 1, & -1 \\ -1, & -1 \end{pmatrix}$ $(i + x - y,\ j - x - y)$

$(2 + x - y,\ i - x - y)$

3, 2 2, −3, (2,2)

not doubtful at all

$x + 5y + 1$ $x = 2, y = 2$

$x + 5y = 2,\ y = 2,\ x = 2.$

16	4	12	25	8
9	17	5	13	21
22	10	18	1	14
15	23	6	19	2
3	11	24	7	20

(3,2) X

6		2		
	7		3	
		8		4
5			9	
	1			10

(1,0) X

15	23	6	19	2
3	11	24	7	20
16	4	12	25	8
9	17	5	13	21
22	10	18	1	14

(3,0) X

Ibid. t. 210. p. 692 : Remarks on Riccati's equation by D. Pompeiu.

(1) Let $y' = py^2 + qy + r$ be a Riccati eqn (p, q, r fns of x). The derivative w.r.t. y of the polynomial in y in the right hand member of (1) gives the equation

$$2py + q = 0, \quad \text{or} \quad y = -\frac{q}{2p} = K(x)$$

This fn being defined, let us denote by $f(x)$ the roots of the diffl equation (1) and introduce the fn, or rather fns, $\varphi(x)$ defined by the condition

$$f(x) + \varphi(x) = 2K(x). \qquad (2)$$

It is clear that the set of fns $\varphi(x)$ is of the same structure as the set of $f(x)$. Let us form the Riccati eqn which $\varphi(x)$'s satisfy : one finds

$$\varphi' = p_1\varphi^2 + q_1\varphi + r_1 \qquad (3)$$

with $p_1 = -p, \quad q_1 = 4pK + q$

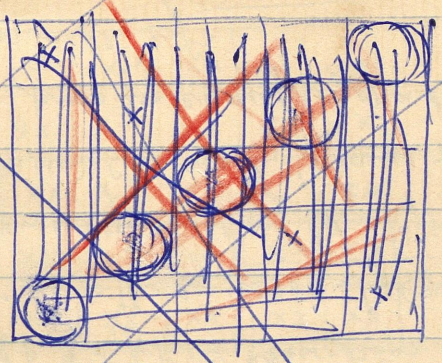
and r_1 a fn of p, q, r & their derivatives ind. of φ.

The eqn (3) is the associate equation of (1) : if by some means we can integrate (1) we can by means of (2) at once integrate (3). and conversely because $f(x)$ & $\varphi(y)$ play the same rôle.

gives an example of a Riccati eqn reducible to Bernoulli eqn

Test of Islamic method for different positions of 1

$a + a' = 0$
$b + b' = -2$



Here scheme is

$$\begin{pmatrix} 1 & , -1 \\ -1 & , -1 \end{pmatrix}$$

$ab' - a'b = -1 - 1 = -2 \neq 0.$

11 + 12 + 13 + 14 + 15

1 + 8 + 15 + 17 + 24 = 65 ✓ (not associative)

~~6 + 13 + 20 + 22~~

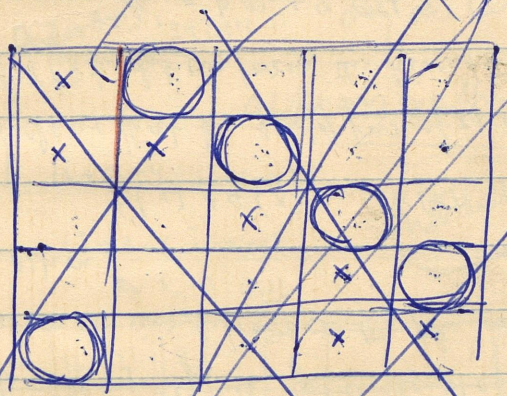
1 + 8 + 17 + 24 + 15 = 65 ✓ (")

1 + 8 + 15 + 17 + 24 = ✓ (")

1 + 8 + 15 + 17 + 24 ✓ (")

1 + 8 + 15 + 17 + 24 ✓ (")

~~1 + 8 + 15~~



Check the downward diagonals.

11 + [illegible] + 15 ✓

5 + 7 + 14 + 16 + 23 ✓

~~7 + 16~~

~~18 + 17~~ 2 + 9 + 11 + 15

~~[illegible]~~ 16 +

5 + 7 + 11 ✓

16 + 4 + 6 + 20 + 22 + 13

3 + 10 + 12 + 19 + 21

2 + 9 + 11 + 18 + 25 ✓

1 + 8 + 15 + 17 + 24 ✓

3 + 10 + 12

16 +

Break moves wrongly taken as 2 up instead of 2 down

Proc. Nat. Acad. Sci: Vol. 26, No. 4. April 1940.

p. 277 – F. P. Jenks – Set of postulates for Bolyai-Lobat.. Geometry – In line with Menger's recent work

p. 280. M. H. Stone – General Theory of Spectra I – Very general & full of interesting consideration – gives an algebraic approach to theory of Spectra. Also topological considerations &.

Ser VII

J. de. Phys. t. 10 (Dec 39). p. 487. G. Petrau: Theory of Elem. particles & photon

p. 504. J. Solomon – on the mass of the neutrino II

t. 10, (Jan 39) – Becquerel on Meta-magnetism

ibid: Ser. VIII. t. 1, (Mar 1940).

p. 90. M. Noetzlin – Volcanism & nucleus structure I

p. 124 – " " II

(19)

~~3 + 8 + 25 + 30~~ ~~35 + 40~~ + 42 + 47

~~27 + 28~~ (29 + 30 + 31 + 32 + 33 + 34 + 35)

3 + 8 + 20 + 30 + 42 + 47 + 25

36 +

(22 + . + 27 + 28) ✓ 61

154
21
151

4 + 9 + 26 + 32 + 37 + 42

+ 21 + ~~18 + 19 + 20 + 21~~

×	×	×	✓	×	×	×
×	×	✓	×	×	×	×
×	✓	×	×	×	×	×
✓	×	×	×	×	×	×
×	×	×	×	×	×	✓
×	×	×	×	×	✓	×
×	×	×	×	✓	×	×

~~25~~
(185)

+48
+31
115

(15 + 16 + 17 + 18 + 19 + 20 + 21) ×

~~15 + 16~~ (8 + 9 + - + 14) ×

(22 + 23 + 24 + 25 + 26 + 27 + 28) ✓

(29 + 30 + 31 + 32 + 33 + 34 + 35) ×

(36 + 37 + 38 + 39 + 40 + 41 + 42) ×

(22 + . - + 28) ✓

(29 + 30 + - + 35) ×

(36 + . . + 39 + . . 42 ×

(43 + + 49) ×

(22 + - + 28) ✓

(29 + 30 + . + 35) ×

(36 + . + 42) ×

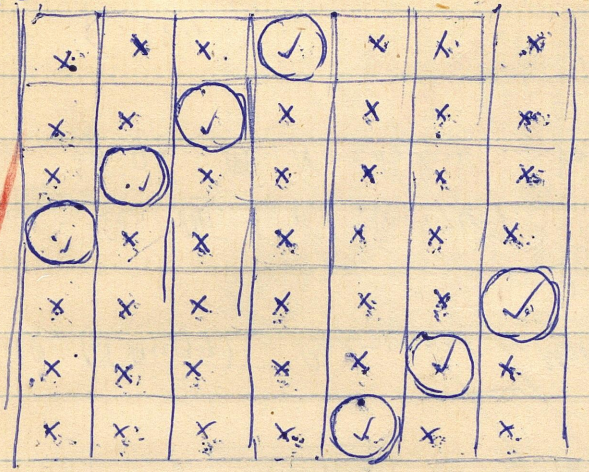
(43 + - + 49) ×

(15 + - + 21) ×

1
13
23
35
40
18
45
175

7
12
17
22
34
39
44
5

2 + 14 + 24 + 29 + 36 41 + 46 + 19 = 175



(0,0) ×; (1,0), (2,0), (3,0), (4,0), (5,0), (6,0)
× × × × ✓ × ×

(38 + 39 + 40 + 41 + 42)

(24)

(0,1), (0,2), (0,3), (0,4), (0,5), (0,6)
× × ✓ × × ×

(1,1), (1,2), (1,3), (1,4), (1,5), (1,6)
× × × ✓ × ×

(20)

(2,1), (2,2), (2,3), (2,4), (2,5), (2,6)
× × × × ✓ ×

(3,1), (3,2), (3,3), (3,4), (3,5), (3,6)
× × × × × ✓

(4,1), (4,2), (4,3), (4,4), (4,5), (4,6)
× × × × × ×

(23) (5,1), (5,2), (5,3), (5,4), (5,5), (5,6)
✓ × × × × ×

(6,1), (6,2), (6,3), (6,4), (6,5), (6,6)
× ✓ × × × ×

(22) centre

~~16 + 19~~
29 +

169 6 + 11 + 16 + 28 + 33 + 38 + 43 ✓ 146
29

really not so colossally difficult
merely checking the ~~up~~ main
upper diagonal - only valid numbers
are (22, 23, 24, 25, 26, 27, 28, 29)
in different order summing to 175

~~4 + 9 + 21 + 26 + 31 + 36 + 48~~ ✓

+32 + 37 + 49

~~5 + 10 + 15 + 27 + 30 + 32 + 42~~ + 47

~~+33 + 38~~ 175

+31

42 + 47

128

Phys. Rev. Vol. 57. (1/1/40). p. 1. Notice of F. K. Richtmyer

p. 3. M. A. Pomeranz – Instability of the meson
(References to Bhabha)

p. 24. Goudsmit & Saunderson – Multiple scattering of electrons

p. 62. Note by Ruark on above paper

ibid (15/1/40). p. 75 – Oppenheimer & etc – Production of soft secondaries by mesotrons

p. 81. Wildhack – Proton-Deuteron H_2^+ as a source of energy in dense stars – Bethes work

p. 127. Darling & Dennison – Water Vapor molecule – Ref to Raman Spectra etc

p. 147 – 150 | R | p. 154. N. Rosen – General relativity & flat Space I and II

ibid – Note on ether-drift expts.

It is only necessary to show that $\Sigma x = \Sigma y = m(2m+1)$

(2) From 1st eqn $y_0 = m,\ x_0 = -2 \equiv (2m-1)$

$y_1 = m,\ x_1 = -1, \equiv 2m.$

$y_2 = m,\ x_2 = 0,$

$x_3 = 1,\ x_4 = 2.$

$\Sigma x = (2m-1) + 2m + 0 + 1 + 2$

$= 2(2m+1) = \Sigma y.$

~~(2) $(m+1) + x_0 - y_0 = 0$~~ For the other diagonal

$m + 2 + x_0 - y_0 = 0,\ 2(m+1) + x_0 - 2y_0 = n-1 = 2m$

$-m + y_0 = -2m,\ y_0 = -m \equiv m+1.$

$4 + x_0 - y_0 = 0,\ 6 + x_0 - 2y_0 = 4,\ -2 + y_0 = -4,\ y_0 = -2 \equiv 3,\ x_0 = -6 \equiv 4,\ (4,3).$

$4 + x_1 - y_1 = 1,\ 6 + x_1 - 2y_1 = 3,\ -2 + y_1 = -2,\ y_1 = 0,\ x_1 = -3 \equiv 2,\ (2,0)$

$4 + x_2 - y_2 = 2,\ 6 + x_2 - 2y_2 = 2,\ -2 + y_2 = 0,\ y_2 = 2,\ x_2 = 0 \qquad (0,2)$

$4 + x_3 - y_3 = 3,\ 6 + x_3 - 2y_3 = 1,\ -2 + y_3 = 2,\ y_3 = 4,\ x_3 = 3 \qquad (3,4)$

$4 + x_4 - y_4 = 4,\ 6 + x_4 - 2y_4 = 0,\ -2 + y_4 = 4,\ y_4 = 6 \equiv 1,\ x_4 = 6 \equiv 1 \qquad (1,1)$

$\Sigma x = \Sigma y = 10$

Let us come back to this later

11/8/77 Take $n = 7$ squares & try diagonal method $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$ for different cells. Must be a colossal job. I wonder if we could get exactly 7 such in this case analogous to the 5 in the case of $n = 7$. — Moreover there are no corresponding figures in Andrews to guide us.

intrn of Euclidean metric within framework of Gen. relativity - $g_{\mu\nu}$ describes gravitational fields but has no connection with geometry. This theory might explain Miller's ether-drift experiments.

---

p. 157. A. A. Turner - Letter on non-existence of Transuranic elements

---

p. 161. Motz & Schwinger - Letter on neutron-deuteron scattering cross section - (thermal neutrons)

Ibid (1/2/40). p. 184. W. V. Houston - Acc^n of electrons in a crystal lattice (from Pasadena).

---

p. 194. R. G. Sachs - Note on nuclear isomerism

---

p. 241. Tisza & others - on Bose-Einstein fluids - London's suggestion re. helium

---

p. 246. (p,p) & (p-n) interactions for Morse potential - Letter by Thaxton & Monroe

---

$2m-2-m$

(4) $\Sigma y - \Sigma x = (2m+1)(m-1) - m(2m+1) = -(2m+1)$

$\Sigma\Sigma y - \Sigma x = (2m+1)(m-1) - m(2m+1) - (2m+1)(m-2) = (2m+1)(2m-1) - m(2m+1)$ ($m-2$)

$= (2m+1)(m-1)$.

$\Sigma y = (2m+1)(m-1) + (2m+n) = m(2m+1)$

$\Sigma x = m(2m+1) + (2m+1) = (2m+1)(m+1)$

$(2m+1)(m+1) + m(2m+1)^2 + (2m+1)$

$= (2m+1)\{(m+1) + m(2m+1) + 1\} = (2m+1)(2m^2+2m+2)$

$\Sigma x + n\Sigma y + n = (2m+1)(2m^2+2m-1),\ (2m+n)(2m^2+2m),\ (2m+n)(2m^2+2m+1),\ (2m+n)(2m^2+2m+2)$

$(2m+1)(2m^2+2m+3)$

5.11, 5.12, 5.13, 5.14, 5.15

Surprising indeed!

(1) Take terms term: $4 + x_0 - y_0 = 0$, $6 + x_0 - 2y_0 = 0$, $-2 + y_0 = 0$, $y_0 = 2$, $x_0 = -2$, (3,2).

$x_0 + 5y_0 + 1 = -2 + 10 + 1 = 9$, $3 + 5y_0 + 1 = 14$ ✓

$4 + x_1 - y_1 = 1$, $6 + x_1 - 2y_1 = 1$, $y_1 = 2$, $x_1 = -1$, $x_1 + 5y_1 + 1 = 9$, $4 + 10 + 1 = 15$ ✓

$\equiv 4$.

$= 2$ $= 2$, $y_1 = 2$, $x_1 = 0$, $x_1 + 5y_1 + 1 = 11$ ✓ $5 + 10 + 1 = 16$ ✗

$= 3$ $= 3$, $y_2 = 2$, $x_2 = 1$, $x_2 + 5y_2 + 1 = 12$ ✓

$= 4$ $= 4$, $y_3 = 2$, $x_3 = 2$ $x_3 + 5y_3 + 1 = 13$ ✓

$-2, -1, 0, 1, 2$

$2m-1, 2m, 0, 1, r$.

$2(2m+1)$

$(2m-1), (2m), (0), (1), (2)$

$4m+2$

$= 2(2m+1)$

(1) $(m+2) + x_0 - y_0 = 0$, $1 + x_0 - 2y_0 = 0$

$(2m+1)(m+2) + \Sigma x - \Sigma y = m(2m+1)$ $\Sigma\Sigma y - \Sigma x = 2(2m+1) \equiv 0$.

$(2m+1) + \Sigma x - 2\Sigma y = m(2m+1)$ $\Sigma\Sigma y - \Sigma x = (2m+1)$

$\Sigma x - \Sigma y = (2m+1)(m-1)$.

$\Sigma x + \Sigma y = (2m+1)$.

$= 2y = (2m+1)(c$.

$\Sigma x = \Sigma y = (2m+1)(m+1)$

$\Sigma x = \Sigma y = m(2m+1)$.

$m(2m+1) + m(2m+1)^2 + (2m+1)$.

$(2m+1)\{m + m(2m+1) + 1\}$

$(2m+1)\{2m^2 + 2m + 1\} \equiv$

$2(2m+1)\{(2m+1)^2 + 1\}$

$\equiv 5$.

ibid. (15/2/40). p. 260. Bethe. Meson theory of nuclear forces I
— General theory
Read ‖ meson theory presented in a simplified way.

---

p. 280. M. E. Rose — Scattering & polarisation of electrons

---

p. 307. Snyder & Weinberg — Stationary states of scalar and vector fields — Based on Pauli's Princeton mimeographed notes of (1935). Also reference to Pauli-Weisskopf & also Kemmer (1939).

---

p. 315. Existence of stationary states of meson field — Schiff.
R ‖ Snyder & Weinberg — mathematical

---

p. 339. A. W. Stern — Letter on nuclear electron showers

---

ibid (1/3/40). p. 383. H. Margenau — Rel. mag. moment of a charged particle — Wigner's symmetries

---

p. 390. Bethe — Meson theory of nuclear forces II: Theory of the deutron
Read ‖

(2) $n(m+1) + \Sigma x - \Sigma y = \frac{1}{2}n(n-1)$; $\Sigma x - \Sigma y = \frac{1}{2}n$

$n(2m+1) + \Sigma x - \Sigma 2y = \frac{1}{2}n(n-1)$.

$\Sigma x - \Sigma y = m(2m+1) - (2m+1)(m+1) = \frac{1}{2}n - (2m+1)$

$\Sigma x - \Sigma 2y = m(2m+1) - (2m+1)^2 = -(2m+1)(m+1)$

$\Sigma 2y - \Sigma x = (2m+1)(m+1)$ $\quad \Sigma y = m(2m+1)$.

$\Sigma y - \Sigma x = 2m+1$. $\quad \Sigma x = (2m+1)(m-1)$

$\Sigma x + n\Sigma y + n = (2m+1)(m-1) + m(2m+1)^2 + (2m+1)$

$= (2m+1)\{m-1 + m(2m+1) + 1\} = (2m+1)(2m^2+2m)$

$\Sigma x - \Sigma 2y = m(2m+1)$ $\quad \Sigma y = \frac{1}{2}(m+1)(m+2)$.

$\Sigma y - \Sigma x = 2m+1$

$(2m+1)(m+1) - m(2m+1)$

$(2m+1)\{(m+1) - m\}$

$\Sigma x = \Sigma y - (2m+1)$

$= m(2m+1) - (2m+1)$

$= 2m^2 + m - 2m - 1$

$= 2m^2 - m - 1$.

$= (2m+1)(m-1)$

$\Sigma x = \Sigma y - (2m+1)$.

$m+2 < 2m+1$

$1 < m$

Muslim p. 426

a homogeneous polynomial of two variables

$\Sigma x - \Sigma y = \frac{1}{2}n$

$\Sigma y - \Sigma x = (2m+1)(m+2) = m(2m+1) + 2(2m+1)$

$-2\Sigma y + \Sigma x = -2m + m(2m+1)$

$m(2m+1) - (2m+1)$

$2m^2 - m - 1$.

$n(m+2) + \Sigma x - \Sigma y = \frac{1}{2}n(n-1)$.

$n + \Sigma x - \Sigma 2y = \frac{1}{2}n(n-1)$.

$\Sigma y - \Sigma x = 2(2m+1)$

$\Sigma x - \Sigma 2y = 2m^2 - m - 1$

$-\Sigma y = 2m^2 - m + 4m + 2 - 1$

$= 2m^2 + 3m + 1 = (2m+1)(m+1)$.

$2m^2 + 3m + 1 - 4m - 2 = 2m^2 - m$

$2m^2 - m = (2m^2 + 3m + 1)(2m+1) + (2m+1)$

$\Sigma x + n\Sigma y + n$

$= \frac{1}{2}(2m+2)(2m+1)(2m+2) + (2m+1)\{2m^2 + 3m + 1\}$

$m + \Sigma x - \Sigma 2y = m(2m+1)$

$m(2m+1) + \Sigma x = \Sigma y$.

$2m + \Sigma x - \Sigma 2y = m(2m+1)$

$\Sigma x - \Sigma 2y = m(2m+1) - 2m(2m+1)$

$\Sigma x = \Sigma y = m(2m+1)$

p. 413. R. D. Richtmyer – Electromag. self energy of mesons – Calculation on the Proca – Yukawa – Kemmer theory – of with theory of Weisskopff (Phys. Rev. 56, 72 (1939).
(Ack. subsequent to Weisskopff & Bloch)

---

p. 458. W. E. Lamb – Deviation from the Coulomb law for a proton – Letter criticising the paper of Heitler, Fröhlich & Kahn & replying to criticism of F. H. K
(Article by Van. Vleck) * p 426.

---

p. 459. Halpern & Hall – Energy losses of fast mesons & electrons in condensed materials – Refers to prev. work of Fermi (Phys. Rev. 56, 1242, (1939)) that cross sections depend on materials. Author confirm existence of a density dependence of collision cross sections

---

ibid (15/3/40). p. 469. Rossi – Electrons arising from disintegration of cosmic-ray mesons.

---

p. 485. Fermi's paper on ionisation loss of energy in gases & in condensed materials

---

$x+ny+k = \frac{1}{2}(n^2-3)$.

$\Sigma x + (2m+1)\Sigma y + n$

$= 2m^2 + 3m + (2m+1)(2m^2+m+2) + (2m+1)$

$m-2+1+mn$

$m+mn-1$

$\frac{1}{2}(n+1)(n-1)-1$

$\frac{1}{2}(n^2-1)-1$

$\frac{1}{2}(n^2-3)$

$mx+y+k$

$\frac{1}{2}m(n+1)$

$\frac{1}{2}(n+1)(n+2)$

$\frac{1}{2}(n^2-1)$

$\Sigma x + (2m+1)\Sigma y + n =$

$= m(2m+1) + (2m+1)^2(m+2) + (2m+1) = (2m+1)(2m^2+5m+2+m+1)$

$= (2m+1)(2m^2+6m+3) = 2(2m+1)($

$n^2+1 = (2m+1)^2+1$

$= 4m^2+4m+2.$

$\Sigma x - \Sigma y = m(2m+1) - (2m+1)(m+2) = -4m-2 = -2(2m+1)$

$\Sigma x - \Sigma 2y = m(2m+1) - 2(2m+1)(m+1) = 2m^2+m-4m^2-6m-2$

$= -2m^2-5m-2.$

$\Sigma 2y - \Sigma x = 2m^2+5m+2$

$\Sigma y - \Sigma x = 4m+2.$

$\Sigma y = 2m^2+m = m(2m+1)$

$\Sigma x = m(2m+1) - 4m - 2 = 2m^2-3m-2 = (2m+1)(m-2) \equiv (2m+1)(m-2) + 2(2m+1).$

$\therefore \Sigma x + n\Sigma y + n = (2m+1)(m-2) + (2m+1)^2 m + (2m+1)$

$= (2m+1)\{m-2+m(2m+1)+1\}$

$= (2m+1)(2m^2+2m-1)$

$= \frac{1}{2}(2m+1)\{(2m+1)^2+1\} = \frac{1}{2}n(n^2+1) = S$

$\frac{1}{2}(2m^2+4m+2)$

$(2m+1)(m-2)+2(2m+1)$

$(2m+1)m$

(2) Now for the lower diagonal elements.

$(0,n), (1,n-1), (0,n-1), (1,n-2), \ldots (n-1,0)$

$2(m+2)+x_0-y_0 = 0, \quad 2(m+1)+x_0-2y_0 = n-1$

$= 1, \qquad = n-2$

$= n-1, \qquad \ldots 1.$

have the same result in adding

$\longrightarrow$

p. 494 - Podolsky & Branson — Quantisation of mass — Cosmology & Dirac eqn & Eddington — sets difficult. diff eqns (ref. to K. Heun, Math. Ann 33 181 (1889).

---

p. 548. Spontaneous disintegration of neutretto — Letter by Sakata & Tanikawa — Crazy letter, refers to failure to find neutrettos in cosmic rays

---

ibid (1/4/40). p. 573. Bethe, Korff & Placzek — Interpretation of neutron measurements in cosmic radiation

---

p. 597. W. H. Zachariasen — Theoretical study of diffuse scattering of X-rays — Related to recent work of Raman on Raman Effect of X-rays in Crystals — Theoretical procedure must be of Zachariasens type

---

p. 641. Jauch & Hill — Degeneracy in Quantum mechanics — shown to be related to the existence of groups of contact transformations under which H is invariant

Read

$\frac{1}{2}(n^2+n)-2$

(1) $y=m,\ x=m-2$ for $\frac{1}{2}(n^2-3)$ in outer cell (11)

(2) $y=m,\ x=m-1$ for $\frac{1}{2}(n^2-2)$ " (12)

(3) $y=m,\ x=m$, $\frac{1}{2}(n^2+1)$ " (13)

(4) $y=m,\ x=m+1$, $\frac{1}{2}(n^2+2)$ " (14)

(5) $y=m,\ x=m+2$, $\frac{1}{2}(n^2+5)$ " (15)

$n=5$

$m=2$

(1) $i+(m-2)-m=m,\ j+(m-2)-2m=m,\ i=m+2,\ j=2m+2\equiv 1$

(2) $i+(m-1)-m=m,\ j+(m-1)-2m=m,\ i=m+1,\ j\equiv 2m+1\equiv 0.$

(3) $i+m-m=m,\ j+m-2m=m,\ i=m,\ j=2m$

(4) $i+m+1-m=m,\ j+m+1-2m=m,\ i=m-1,\ j=2m-1.$

(5) $i+m+2-m=m,\ j+m+2-2m=m,\ i=m-2,\ j=2m-2$

Let us employ cells $(0,0)\ (1,1),\ (2,2),\ (3,3),\ (4,4)$ be $(x_0,y_0)-(x_4,y_4)$ ---$(n-1,n-1)$

(1) $(m+2)+x_0-y_0=0,\ 2(m+1)+x_0-2y_0=0$

$(m+2)+x_1-y_1=1,\ 2(m+1)+x_1-2y_1=1$

Adding $n(m+2)+\Sigma x-\Sigma y=\frac{1}{2}n(n-1)$

$2n(m+1)+\Sigma x-2\Sigma y=\frac{1}{2}n(n-1).$

$\Sigma x-\Sigma y=\frac{1}{2}n(n-1)-2n\left\{\frac{1}{2}(n-1)+2\right\}$

$=\frac{1}{2}n(n-1)-2n\cdot\frac{1}{2}(n+3)$

$=\frac{1}{2}(2m+1)2m-\frac{1}{2}(2m+1)(m+2)$

$=2m^2+m-2(2m^2+3m+2)=2m^2+m-2m^2-5m-2$

$=-2(2m+1)$

$=-2m^2-5m-4$

$\Sigma x-\Sigma y=m(2m+1)-2(2m+1)(m+1)=-2m^2-5m-4.$

$\Sigma y-\Sigma x=4m+2$

$\Sigma 2y-\Sigma x=2m^2+9m+4.$

$\Sigma y=2m^2+5m+2=(2m+1)(m+2)$

$\Sigma x=2m^2+m=m(2m+1)$

– group considerations – Reference to Weyl's new book on the Classical groups – Read this paper.

---

p. 646 : J.S. de Wet – on the connection between spin & Statistics of Elementary particles – on the lines of Pauli–Fierz's work. R ‖ not very clear. Read this

---

p. 660. B. Rossi – System of units for nuclear & cosmic ray phenomena

---

ibid (15/4/40). p. 757. Present & Knipp – Dynamics of complex fission – Refs to Bohr & Wheeler.

Nuovo Cimento : New Series year. 17. N. 1, p. 5 :
G. Gentile – on the Dirac wave eqn – Refs to Kemmer, Yukawa, Pauli–Fierz

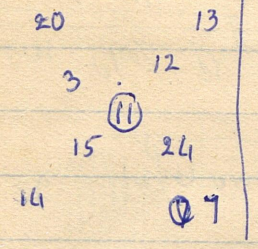
---

p. 26. Majorana on the teaching (insegnamento) of Physics

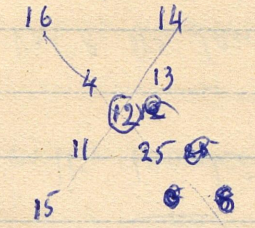
Journ. Chem. Phys : Vol 8, No. Jan 40.
p. 116 : W. Band – Statist. mech of Condensation phenomena

---

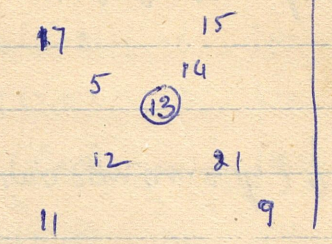
(1) $(i,j) = (4,1)$



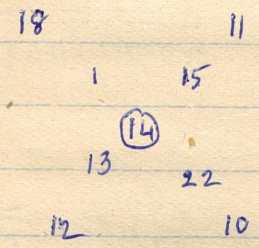
(2) $(i,j) = (3,0)$



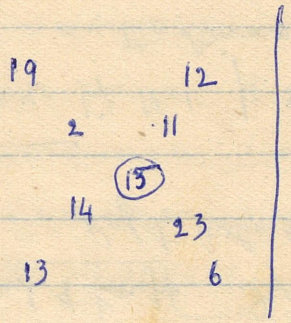
(3) $(i,j) = (2,4)$



(4) $(i,j) = (1,3)$



(5) $(i,j) = (0,2)$



The possible cases have 15, 14, 13, 12, 11 in the centre & in the main ~~drop~~ upper diagonal (11, 12, 13, 14, 15) in some order

$x+5y+1 = 15$

Choose (i,j) so that the middle cell contains 15 for which $x = 4, y = 2$

$i + 4a + 2a' = 2, \quad j + 4b + 2b' = 2$

$i = (1 - 2a - a')2, \quad j = (1 - 2b - b')2$

$i = (1 - 2 + 1)2, \quad j = (1 - 2 + 2)2 \quad$ ie $(i,j) = (0,2)$ as above.

$13 = \frac{1}{2}(n^2+1) = \frac{1}{2}\{(2m+1)^2+1\} = 2m^2+2m+1.$, $x + (2m+1)y + 1 = 2m^2 + 2m + 1$

$= 2m(m+1)$

$x+ny+1 = \frac{1}{2}(n^2+1) \quad 2x+2ny+2 = n^2+1$ ↗ $x = y = m$

$2x + 2ny + 1 = n^2$, $x = \frac{1}{2}(n-1) = y \quad (n-1) + n(n-1) + 1 = n^2$

$15 = \frac{1}{2}(n^2+1) + 2 = 2m^2 + 2m + 3$

$x + (2m+1)y + 1 = 2m^2 + 2m + 2$

$y = m, \quad x = m+2 \rightarrow m + 2 + m(2m+1) =$

p. 127. L. Balamuth – Letter on Born's theory of melting

J. App. Phys: Vol 11. Jan 1940, p. 2. T. H. Osgood – Physics in 1939

p. 70. Resumés of recent research – Nuclear fission

March 1940: p. 159. Atom smashing vs Humanity smashing

p. 160 – on Ferromagnetism

April 1940, p. 241. Kuiper – Stellar temperatures.
(Good ref for a lecture)

May 1940. p. 301. The analytical Physicist

Proc. Camb. Phil Soc Vol. 36 Pt 2 p. 160. Born – Stability of crystal lattices

p. 173. R. D. Misra – on same.

(3, 1)

22	4	6	13	20
3	10	12	19	21
9	11	18	25	2
15	17	24	1	8
16	23	5	7	14

(3,0)

(0,2)

19	21	3	10	12
25	2	9	11	18
1	8	15	17	24
7	14	16	23	5
13	20	22	4	6

(Here ✓ A does not work).

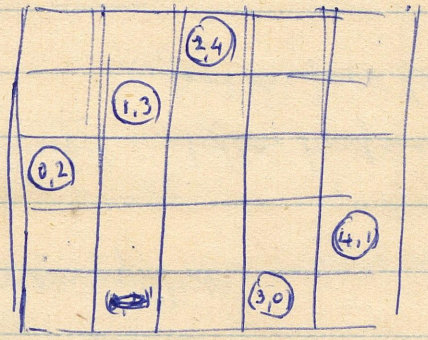
(1,1)

6				4
			3	
		2		
	1			
5	7			

X

16	23	5	7	14
22	4	6	13	20
3	10	12	19	21
9	11	18	25	2
15	17	24	1	8

(A fails).



Theorem of type of eqns (?)

Summary

The cases: (4,1), (1,3), (0,2), (3,0), (2,4) for (i,j) containing 1 appear to be the only possible ones for the 3rd. diagonal method of test

In (4,1), (2,4), (1,3) both the 3-D & Associated square methods work.

In (0,2) & (3,0) the 3-D works, but not the other, these two are neither associated nor nasik

In cases (4,1), (1,3) the 3-D. works & does not give associated squares

only (2,4) gives associated & is identical with the other method.

p. 139. Steen's article No. V on rings of operators – this work referred to by M. H. Stone

---

p. 209. H. P. Robertson – on turbulence theory

Comptes Rendus U.S.S.R. : vol. 26 (1940)

No. 1. p. 3. O. J. Schmidt – on Frobenius groups

---

p. 6. Kolmogoroff – Curves in Hilbert Space invariant for 1 parameter group of motions

---

p. 10. Plessner – Spektraltheorie

---

p. 37. Ivanenko & Sokolov – Generalised Wave equation and Classical mesodynamics
– Reference to Bhabha's 1939 paper in Roy. Soc. Proc.
– also mentions Born's theory

No. 2. p. 115. Kolmogoroff – Wiener's spirals & other interesting curves in Hilbert space.

(c) It works as if this magic in the two main diagonals is special for $n=5$.

Are there any more cases where A & D.D. agree. on p.7 we have seen $(i,j) = (3,2)$ & $(1,2)$ don't agree

Thus we have to test only the cases $(2,1), (2,3), (4,2), (4,3), (1,4), (2,4), (3,4)$,

(2,1)

4	6	13	20	22
10	12	19	21	3
11	18	25	2	9
17	24	1	8	15
23	5	7	14	16

D.D. fails ×

(2,3)

11			2	9
		1	8	
	5	7		
4	6			
10				3

D.D. fails

(4,2)

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

D.D. fails

(4,3)

2	9	11	18	25
8	15	17	24	1
14	16	23	5	7
20	22	4	6	13
21	3	10	12	19

D.D. fails

(1,4)

24	1	8	15	17
5	7	14	16	23
6	13	20	22	4
12	19	21	3	10
18	25	2	9	11

D.D. fails

(2,4)

17	24	1	8	15
23	5	7	14	16
4	6	13	20	22
10	12	19	21	3
11	18	25	2	9

✓ Normal Case

(3,4)

15	17	24	1	8
16	23	5	7	14
22	4	6	13	20
3	10	12	19	21
9	11	18	25	2

D.D. fails

(1,4)

1	8	15	17	24
7	14	16	23	5
13	20	22	4	6
19	21	3	10	12
25	2	9	11	18

×

(1,3)

18	25	2	9	11
24	1	8	15	17
5	7	14	16	23
6	13	20	22	4
12	19	21	3	10

works

p. 119 - 123. G. Sirvint — 2 articles on linear spaces & fnals.

No. 3. p. 214. Menchoff — Repn of measurable fns by Fourier Series

No. 4. p. 315 — Dietzmann — on group theory — congruence of a system of elements of a group w.r.t a double modulus

p. 323. Method of complex variations in kinematic sph. geometry — Roupscheff — Elem. article

No. 5. p. 429. L. Landau: Polarisation of electrons by scattering — Ref to Rose & Bethe. Phys. Rev 55, 277

No. 6. p. 526 — Green's fns of ord. diff. eqns — P. Kalafaty

V.R.T

p. 535. Taldykin — normal system of fns

p. 540. Do — Integral eqns with normal & semi-normal nucleii

p. 556. Mindline: The diffraction of a plane wave

(ii) $(i, j) = (4, 1)$, I.D. case also works (see p. 7)

$$\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}.$$

$(i + x - y,\ j + x - 2y)$ ie $(x - y + 4,\ x - 2y + 1)$ $\qquad x + 5y + 1 = 11,\ x + 5y = 10,$
$x = 0,\ y = 2.$

$x = 0,\ y = 2$ is the cell $(2, -3)$ ie $(2, 2)$.

cells $(0,0)$ & $(4,4)$, $x_1 - y_1 + 4 = 0$, $x_2 - y_2 + 4 = 4$ $\qquad (x_1 + x_2) - (y_1 + y_2) = -4$

$x_1 - 2y_1 + 1 = 0$, $x_2 - 2y_2 + 1 = 4$. $\qquad (x_1 + x_2) - 2(y_1 + y_2) = 2$

$y_1 + y_2 = -6$, $x_1 + x_2 = -10$, $\quad x_1 + x_2 + 5(y_1 + y_2) + 2 = -10 - 30 + 2 = -38$ $\qquad \frac{1}{2}(n^2+1) - 2$

$= 4$, $x_1 + x_2 = 0$. $y_1 = -3$, $x_1 = -7$. $\equiv (x_1, y_1) \equiv (3, 2)$.

$x_1 + 5y_1 + 1 = 3 + 10 + 1 = 14$ ✓ $\qquad n = 5$, $125 + 9$, 134

$x_2 = -3$, $x_2 = -3$, $x_2 = 2$, $y_2 = 2 \longrightarrow x_2 + 5y_2 + 1 = 13$ ✓ $\qquad 14 + 13 = 27 = 25 + 2$

$\frac{5}{2}(n^2+1) = \frac{1}{2}n(n^2+1)$ $\qquad 2(n^2 + 2) + \frac{1}{2}(n^2 - 3) = \frac{1}{2}(5n^2 + 5) = \frac{5}{2}(n^2+1)$

$n = 5$

$5n^2 + 5 = n^3 + n$ $\qquad n^3 - 5n^2 + n - 5 = 0$

$n^2(n-5) + (n-5)$

$(n-5)(n^2+1)$

125 –

~~Sing for downward diagonal elements also~~

$x - y + 4 = 1$, $x - 2y + 1 = 1$ $\qquad x - y + 4 = 3$, $x - 2y + 1 = 3$

$y = -3$, $x = -6$ $\qquad y = -3$, $x = -4$

$(4, 2)$ $\qquad (1, 2)$

$x + 5y + 1 = 15$ ✓ $\qquad x + 5y + 1 = 12$ ✓

Value of (x, y) corresponding to cells $(0,0)$, $(1,1)$, $(2,2)$, $(3,3)$, $(4,4)$ are $(3,2)$, $(4,2)$, $(0,2)$, $(1,2)$, $(2,2)$.

For downward diagonals $(0,4)$, $(1,3)$, $(2,2)$, $(3,1)$, $(4,0)$

$x - y + 4 = 0$	$x - y + 4 = 1$		$x - y + 4 = 3$	$x - y + 4 = 4$
$x - 2y + 1 = 4$	$x - 2y + 1 = 3$		$x - 2y + 1 = 1$	$x - 2y + 1 = 0$
$y = -7$, $x = -11$	$y = -5$, $x = -8$		$y = -1$, $x = -2$	$y = 1$, $x = 1$
$(2, 1)$	$(2, 0)$	$(0, 2)$	$(3, 4)$	$(1, 1)$
$(4, 3)$				
↓	↓	↓	↓	↓
20	3	11	24	7

note

by a circle — Is not this the work which V.R.T was trying to do for Sir C.V.? — Author uses Tchebycheff polynomials — Refers to Levi Civita, Lamb, Volterra, Sonine

---

note

p. 561. Same author on distribution of waves in space of 3 dimensions — Ref to Rayleigh's Theory of sound Generalisation of previous paper.

No. 7. p. 619. P. Alexandroff — On the dimension of bicompact spaces

---

note

p. 623. — Do — The Betti groups and the homologising of locally-bicompact spaces — obviously two imp. articles by the master of topology

---

p. 631. B. Levitan — Generalised operation of translation in connection with almost periodic fns

---

Bull. Soc. math de France. t. 67. Fasc. 3-4

For the lower diagonal elements corresponding to $(0,4), (1,3), (2,2), (3,1), (4,0)$.

$(0,4)$ & $(4,0)$ are skewly related $\qquad (0,4)$

$$\left.\begin{array}{l} i + x - 2y = 0, \quad i + x - 2y = 4 \\ j + x - 3y = 4, \quad j + x - 3y = 0 \end{array}\right\}$$

$x + 5y + 1 = \cancel{18}\ 17$
$x = 2, y = 3$

with $i = 4, j = 1$, $\left.\begin{array}{l} 4 + x - 2y = 0, \quad 4 + x - 2y = 4 \\ 1 + x - 3y = 4, \quad 1 + x - 3y = 0 \end{array}\right\}$ $\left.\begin{array}{l} x - 2y = -4 \\ x - 3y = +3 \end{array}\right\}$ $\left.\begin{array}{l} x - 2y = 0 \\ x - 3y = -1 \end{array}\right\}$

ie $(y = -7, x = -18)$ & $(y = +1, x = +2)$ $\qquad (3,2)$. $x = 2, y = 3 \rightarrow 2 + 15 + 1 = 18$

$(x,y) = (3,4)$ & $(1,2)$, $3 + 20 + 1$, $1 + 10 + 1$ $\quad (24, 12)$ $\quad x = 2, y = 1 \rightarrow 2 + 5 + 1 = 8$

Sum $= 26$.

$$\cancel{\left\{\begin{array}{l} x + 5y + 1, \quad \cancel{2m - x} \\ 4 - x + 5(4 - y) + 1 \quad \{25 - (x + 5y)\} + (x + 5y + 1) = 26 \end{array}\right.}$$

~~without~~ Can this be derived in general for the case where the middle number is in the central cell?

$\cancel{i + y'n + 1}$, $\cancel{\frac{1}{2}(n^2+1)}$ $\quad x + yn + 1 = \frac{1}{2}(n^2+1)$ or $x + yn = \frac{1}{2}(n^2 - 1)$, $x = \frac{1}{2}(n-1) = y \rightarrow \frac{1}{2}(n-1) + \frac{1}{2}n(n-1)$

$= m$ $\qquad \frac{1}{2}(n-1)(n+1) = \frac{1}{2}(n^2-1)$

$\cancel{x + yn + 1}$, $\cancel{i + y'n = n^2}$

$x + yn = n^2$
$x = 0, y = n$

$i + ax + a'y = m$, $j + bx + b'y = m$, if $x = y = m$

$i = m(1 - a - a')$, $j = m(1 - b - b')$.

Cells (α, β), $(2m - \alpha, 2m - \beta)$ have nos. which are complementary

$$\left.\begin{array}{l} i + ax_1 + a'y_1 = \alpha \\ j + bx_1 + b'y_1 = \beta \end{array}\right\} \quad \begin{array}{l} i + ax_2 + a'y_2 = 2m - \alpha \\ j + bx_2 + b'y_2 = 2m - \beta. \end{array}$$

$2i + a(x_1 + x_2) + a'(y_1 + y_2) = 2m$

$\cancel{2m} - 2m(a + a') + a(x_1 + x_2) + a'(y_1 + y_2) = \cancel{2m}$.

$a(x_1 + x_2) + a'(y_1 + y_2) = 2m(a + a')$

and $b(x_1 + x_2) + b'(y_1 + y_2) = 2m(b + b')$

ie $x_1 + x_2 = y_1 + y_2 = 2m$

$x_1 + x_2 + (2m+1)(y_1 + y_2) + 1$

$= 2m + 2m(2m+1) + 1$

$= n^2 + 1$

p. 132 — Trigonometry of small curvatures & — Ref. to Levi Civita's work

p. 177. Gambier — Tetrahedra inscribed in a bi-quadratic etc.

Ann. de l'ecole norm. Sup: t. 56 (1939). Fasc. 3
p. 173 — Series of polynomials of form $\sum a_n P_n(x)$

ibid. t. 57 (1940). Fasc. 1, E. Vessiot — automorphic groups.

Acta Math. 71. 3-4 : p. 191. L. Berwald — Cartan spaces

p. 249. M. Mathisson — Hadamard problem on diffusion of waves

p. 283. R. Lagrange — on surfaces of revolution

p. 317. A. Gorny — Derivatives of sets

Annals of Math Vol. 41. No. 1 (Jan 40). —
Vol 41. No. 2. (Apr. 40).
p. 310. P. Erdös — Extremal properties of derivatives of polynomials

Consider $(i,j) = (4,1)$ where both A & I.D. work [I.D = Indian diagonal]

and $(i,j) = (1,2)$ where A works but not I.D.

Is there a case where I.D. works but not A? No. There don't appear to be any.

(i) $(i,j) = (4,1)$ – In Andrew's case (a), 25 will then be in $(0,3)$ & break move from 25 to 1 ie reqd break move is ↲ ie $a + a' = -1$, $b + b' = -2$ with $a = 1$, $b = 1$, $a' = -2$, $b' = -3$, $ab' - a'b = -1$.

~~In the I.D. case~~ ie $\begin{pmatrix} 1, & -2 \\ 1, & -3 \end{pmatrix}$ is the scheme

In I.D. case (b) the scheme is the usual $\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$

(a) Any cell $(i + x - 2y,\ j + x - 3y)$ & no $= x + 5y + 1$.

If $x + 5y + 1 = 13$, $x = 2$, $y = 2$ & ~~Corresp cell in (4+2-4, 1+2-6)~~

& this gives $(4+2-4,\ 1+2-6) = (2,-3) \equiv (2,2)$. ie central cell.

~~Diag~~ upper diagonal ~~elements~~ cells are $(0,0), (1,1), \ldots (4,4)$

& lower " are $(0,4), (1,3), \ldots (4,0)$

$x + 5y + 1 = 10$

$x = 0,\ y = 2$

Corresponding to $(0,0)$, $4 + x - 2y = 0$, $1 + x - 3y = 0$, $x = -10$, $y = -3$, $x = 0$, $y = 2$.

~~Taking $\Sigma \to 20 + \Sigma x - 2\Sigma y = (0+1+\cdots+4)$~~ $x + 5y + 1 = 11$.

~~& $5 + \Sigma x - 3\Sigma y =$ "~~

~~$2\Sigma x - 5\Sigma y = 5$ $\Sigma x + 5\Sigma y + 1$, $3\Sigma x - 4$~~

For $(1,1)$, $4 + x - 2y = 1$, $1 + x - 3y = 1$; $x - 2y = -3$, $x - 3y = 0$, $y = -3$, $x = -9$

ie $x = 1$, $y = 2$

$x + 5y + 1 = 12$.

Similarly we get 13, 14, 15 for $(2,2), (3,3), (4,4)$, ~~(0,5)~~

$(0,0), (4,4), (1,1), (3,3)$, are skewly related ie if cells are $(i_1, i_2), (i_1', i_2')$

$i_1' = 2m - i_1$, $j_1' = 2m - j_1$ in general.

For eg $(4,1), (0,3)$ are skewly related.

p. 269. Koopman — axioms & algebra of intuitive probability

p. 394. C. Chevalley — Theorie du corps de classes.

p. 419. M. Morse — Rank & span in functional topology

p. 455. Einstein & Infeld — gravitational eqns & the problem of motion II — Continuation of a previous paper

Quart. J. Math. Vol 11, March 60.

p. 63. Christopherson — Note on the vibration of membranes — Ref: to Rayleigh who says solns are unknown for boundaries having form of regular hexagon or equilateral triangle — author gives a soln — Cf. with Seth's stupid note on rt Ld isos. Δle.

Articles by Feldheim, Bailey & E. M. Wright on Sp. Fns

Proc. Lond. Math. Soc. Vol. 46. Pt. I

p. 1. Pitt — on Wiener's harm. analysis

1	8	15	17	24
7	14	16	23	5
13	20	22	4	6
19	21	3	10	12
25	2	9	11	18

X

(a) obviously does not work.

Simly if $(i,j) = (0,0), (2,2), (3,3), (4,4)$.

(b) Try with $(i,j) = (0,4)$

Also does not work.

~~Similarly $(i,j) = (0,1), (0,2), (0,3)$ does not appear likely to work~~

20	22	4	6	13
21	3	10	12	19
2	9	11	18	25
8	15	17	24	1
14	16	23	5	7

✓

$(i,j) = (4,1)$ $\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$

~~Taking $(i,j) = (4,1)$~~

25	2	9	11	18
1	8	15	17	24
7	14	16	23	5
13	20	22	4	6
19	21	3	10	12

X

$(i,j) = (0,3)$

$(i,j) = (4,1)$ works but not associated ie for same (i,j) but different (a',b') the schemes works. So the mystery appears to be thickening for want of ~~to~~ magic light!

Take again $(i,j) = (1,2)$ where Andrews scheme works

but strict diag. method does not work

3	10	12	19	21
9	11	18	25	2
15	17	24	1	8
16	23	5	7	14
22	4	6	13	20

X

$(i,j) = (3,2)$ $\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$

Simly for $(i,j) = (3,2)$

where Andrews works

but ~~A~~ D. does not

Semimagic

12	19	21	3	10
18	25	2	9	11
24	1	8	15	17
5	7	14	16	23
6	13	20	22	4

X

semi-magic

$(i,j) = (1,2)$ $\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$

p. 55 : Hyslop – Summability & Fourier Series – Results which appear akin to what K. S. K. mentioned

---

ibid. Part 2. p. 81. Rosa M. Morris – Torsion problem

---

p. 99. V. C. A. Ferraro – Induced currents in ∞ plane current sheets I

---

p. 113. A. G. Walker – Relativistic Mechanics – on Milne's theory – hyperbolic

---

ibid Pt. 3. p. 231. The units of group-rings by G. Higman

Proc. Phys-math. soc. Japan

Vol. 22. No 1. p. 1. S. Iguchi – Erz. Schwing. der allseitig eingespannten rechteckigen Platten –

---

ibid No. 2: p. 196. T. Okaya – Flow between [illegible] parallel walls – Hydrodyn

$i = 1, j = 3$, $\begin{pmatrix} 2, & -1 \\ 1, & -1 \end{pmatrix}$

$a+a' = 1$
$b+b' = 0$

14	20	21	2	8
25	1	7	13	19
6	12	18	24	5
17	23	4	10	11
3	9	15	16	22

magic ✓

If $i + 2x - y = 2$ & $j + x - y = 2$

ie $1 + 2x - y = 2$, $3 + x - y = 2$

$2x - y = 1$, $x - y = -1$ ie $x = 2, y = 3$

& no. in central cell $= x + ny + 1 = 2 + 15 + 1 = 18$

$i = 3, j = 1$.

10	11	17	23	4
16	22	3	9	15
2	8	14	20	21
13	19	25	1	7
24	5	6	12	18

not magic X – ~~upper~~ main upper diagonal fails.

Surprising.

There appears to be no simple of way (without actually writing down the square) to find, for given $\begin{pmatrix} a & a' \\ b & b' \end{pmatrix}$, what (i, j) will give a magic square.

Let us come back to the Ind. diag. method where we have data for all $(i; j)$ given in Andrews. p. 10.

Taking only ↗ we do not get magic squares. for ~~(0,0), (0,1), (0,2), (0,3), (0,4) &~~ all elements (i, j) in first row (1st from bottom) & 1st col. & then for $(1,1)$, $(2,2)$, $(3,3)$, $(4,4)$.

But Andrews presupposes associativeness & hence takes $(a+a', b+b')$ depending on (i, j).

Suppose we don't assume associativeness but only take $\begin{pmatrix} a & a' \\ b & b' \end{pmatrix} = \begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$ ie strict Ind. method.

and test a few cases barred in Andrews.

~~(i)~~. $(i, j) = \cancel{(0,0)}$. $(i, j) = (1,1)$

p. 188. S. Mirjazima — on the (n-p) scattering & spin interaction of elem. particles

---

ibid. No. 3. p. 199. T. Sakai — Gibbs canonical ensemble

---

p. 208. Flow of compressible flin parts a $\odot^r$ cyl.

---

p. 257. K. Umeda — Note on a model of nuclear fission — Ref to Bohr-Wheeler paper

---

J. Math & Phys. Vol. 19. No. 1 (Jan 1940).
p. 34. Soln of integral eqns by approximation

---

ibid. No. 2 (April 40).
p. 93. J. Douglas — Geometry of polygons in the complex plane

---

p. 140. N. Coburn — Einstein spaces rel. surfaces of const. K

Sastry

Suppose we start somewhere else say $i = 2, j = 4$

~~13~~ 19	~~19~~ 25	1	7	~~8~~ 13
5	6	~~6~~ 12	~~12~~ 18	~~18~~ 24
11 ~~10~~	~~11~~ 17	23	4	10
~~16~~ 22	3	9	~~9~~ 15	16
8	~~8~~ 14	~~14~~ 20	21	2

(ii)

We get magic square with diagonals also correct.

Not nasik all other upper diagonals except main failing

note ~~(a+b)=0~~ $a' - b' = 0$ //

all lower diagonals magic

This is an example of a square neither associated nor magic.

Rouse-Ball's method of making the main diagonals magic by making square associated is only a special case. There must be other ways of ensuring that the two main diagonals are magic or at least choosing (i, j) so as to ~~make sq~~ ensure this.

any cell is $(i + 2x - y, j + x - y)$. If this be $(2,2)$ with $x = 2, y = 2$

$i + 2 = 2, \; j = 2, \; i = 0, j = 2$ as in fig on p. 5 bottom //

Start with a corner $(0, 4)$ $i = 0, j = 4$.

1	7	13	19	25
12	18	24	5	6
23	4	10	11	17
9	15	16	22	3
20	21	2	8	14

(iii)

not magic – all upper diagonals except one not magic

all lower diagonals magic.

Let us examine central cells in (ii) & (iii)

$2x - y = 1$
$x - y = -1$
$x = 2, y = 3$ //

(ii) $i + 2x - y = 2, \; j + x - y = 2$. for central cell.

$x + 5y + 1 = 23, \; x + 5y = 22$

$5y = 22 - x$,

x	y	x
2	4	
$2 \equiv 7$	3	$\to i = 2 - 4 + 3 = 1, j = 3$
$2 \equiv 17$	1	$\to i = 3, j = 1$ //

- For $x = 2, y = 4$, $i = 2 - 4 + 4 = 2$, $j = 2 - 2 + 4 = 4$ } as taken //

J. Sc. Hiroshima Univ. Vol. 10 (March 1940).

p. 7. F. Maeda — Ideals in Boolean Algebra

J. de Math. t. 19, (1940).

p. 27. H. Lebesgue — Some simple consequences of Euler's formula ($F + S - A = 2$).
— Elementary paper — Very interesting

---

ibid. p. 143. Polrōn — Decomposition of a finite continuous map.

---

p. 197. Milloux — Extn of an inequality of Nevanlinna

Nature (26/4/40). Vol. 145.

p. 617. Obituary notice of O. Toeplitz by M. Born (Jew).
— Very good obituary notice — full of interesting information

---

p. 626. Letters on Relativity theory — Dingle & others
— Interesting controversy

Here $a - b = 0$, upper diagonals fail

all lower diagonals are albright

Semi-~~nasik~~ magic //

$2 + x - y = 2$ $\quad x - y = 0$

$4 + x - 2y = 2$ $\quad x - 2y = -2$

$x = y = 2$

$x + ny + 1 = 2 + 10 + 1$

$= 13$ //

(ii) Take Bachet's scheme $\begin{pmatrix} 1, & -1 \\ 1, & 1 \end{pmatrix}$ & same $(i, j) = (0, 4)$

~~a+b~~ $\quad 2, 0.$

$a = 1, b = 1, a' = -1, b' = 1 \quad ab' - a'b = 2$

$a + a' = 0, \; b + b' = 2$

1	~~17~~ 14	~~7~~ 22	~~25~~ 10	~~13~~ 18
~~18~~ 13	~~6~~ 21	~~24~~ 9	~~12~~ 17	5
~~19~~ 25	~~23~~ 8	16	4	12
~~22~~ 7	~~15~~ 20	3	~~16~~ 11	~~7~~ 24
~~14~~ 19	2	~~20~~ 15	~~8~~ 23	~~24~~ 6

Here $a - b = 0$, $a' + b' = 0$ ∴ not ~~pa~~ nasik

fails in ~~all~~ lower diagonals except main & upper diagonals ~~except the main~~.

so semi-magic only.

rows & cols are albright //

$0 + x - y$

$4 + x + y$

(1, 3) $\quad x - y = 1, \; x + y = -1$

$4 + x + y = 3 \quad x = 0, \; y = -1 \equiv 4.$

$x + 5y + 1 = 21$ ✓

(iii) $a = 2, b = 1; a' = -1, b' = -1$ → Knight move ↑ & break move (1, 0)

$ab' - a'b = -2 + 1 = -1$ //, $a + a' = 1, b + b' = 0$ //

$a + a' = 1, b + b' = 0$

$a + b = 3$
$a - b = 1$
$a' + b' = -2$
$a' - b' = 0$

at nasik of course

9	15	~~8~~ 16	22	3
20	~~20~~ 21	2	~~12~~ 8	14
1	~~17~~ 7	13	~~8~~ 19	25
12	~~18~~ 18	24	5	6
23	4	10	11	~~7~~ 17

(i)

$i + 2x - y = 2, \; j + x - y = 2.$

$x + 5y + 1 = 13, \; x = 2, y = 2.$

$i + 2 = 2, i = 0, \; j + 0 = 2, \; j = 2$ //

associated albright

Ibid (27/4/40) p. 667 – Letter by Raman & Nilakantan on X-rays

(Nature 14 (11/5/40). p. 741. R. Fürth ; M. Born : Relation between breaking & melting – Letter & reply – Obviously this new work of Born appears to become very important – Fürth's result that magnitude of tensile strength and heat of melting are of same order is new & surprising – joint hope promise

p. 753. International Commission on mass & glaciers !

Ibid (4/5/40). p. 687. R. Peierls – Theory of nuclear forces – Interesting popular article

Good for a lecture

p. 703. Cosmic rays & Cyclones – Letter by Nishina & de

11/7/40 Proc. Phys. Soc. 52 (1/5/40), p. 420. Review of O. Rahilly's book by P.V – Interesting

Phys. Rev. 57 (1/5/40) p. 787. V.F. Hess – Seasonal

Number corresponding to (α, β) & $(6-\alpha, 6-\beta)$ are

$5x + 5y + 1$ & $5x + 5(6-y) + 1 = 36 - 5y + 1$

Number corresponding to cell (α, β)

$3 + x - y = \alpha$
$5 + x - 2y = \beta$

$x = 2\alpha - \beta - 1$
$y = 2 - \beta + \alpha$

$x + 5y + 1 \quad 2\alpha - \beta - 1 + 5(2 - \beta + \alpha) + 1 = 9 - 3\alpha - 6\beta$

$9 - 3(6-\alpha) - 6(6-\beta)$

$18 - 18 - 18 - 18 - 36 = -36$ (?)

$x + 5y + 1 = (2\alpha - \beta - 1) + 5(2 - \beta + \alpha) + 1 = 7\alpha - 6\beta + 10$

No. corresponding to $(6-\alpha, 6-\beta)$ is $7(6-\alpha) - 6(6-\beta) + 10 = 16 - 7\alpha + 6\beta$

Sum of nos $= 26 = n+1$.

Suppose we take same (a, b, a', b') and take $(i, j) = (1, 5)$.

Corresponding cell is $(1 + x - y, 5 + x - 2y)$

No. of cell $(1,1)$: $1 + x - y = 1$, $5 + x - 2y = 1$. $x = y$, $x - 2y = -4$

$-y = -4$, $y = 4 = x$.

$x = 4, y = 4$ No. $= 4 + 20 + 1 = 25$

1	8	15	17	24
7	14	16	23	5
13	20	22	4	6
19	21	3	10	12
25	2	9	11	18

No in cell $(3,4)$, $1 + x - y = 3$, $5 + x - 2y = 4$

$x - y = 2$
$x - 2y = -1$

$y = 3$
$x = 5$

$5 + 5 + 1 = 11$ $\quad x = 0, y = 3$

$0 + 15 + 1 = 16$

and atmospheric temp. effect in cosmic radiation

---

p. 795. S. Siegel & Zachariasen: New diffraction maxima in X-ray photographs — Connected with Raman – Nilakantan's new work

---

p. 797. Infeld & Wallace — Eqns for electron in electrodynamics — general method of Einstein-Hoffmann-Infeld leads to Dirac's eqns — Read this paper carefully at once — Refers to Einstein & Infeld's paper in Ann of Math

Read

---

p. 807. Soln of eqns for particles of spin 0 or 1 when no field is present — A. H. Taub — References to Kemmer, Duffin, Belinfante.

Read

---

p. 829. H. Mueller (Massachusetts) — Properties of rock salt — also see p. 842.

---

p. 844. Letter by Schiff — Scattering of light by liquid helium

---

4th row : $(x,y) = (2,4),(4,0),(1,1),(3,2),(0,3)$; $x-2y = -6,4,-1,-1,-6 \equiv 4$ ✓

5th row : $(x,y) = (1,3),(3,4),(0,0),(2,1),(4,2)$; $x-2y = -5,-5,0,0,0 \equiv 5$ ✓

Re: cols. $x-y \equiv c$. from bottom.

1st col : $(x,y) = (0,2),(4,1),(3,0),(2,4),(1,3)$; $x-y \equiv -2,3,3,-2,-2 \equiv 3$ ✓

2nd col : $(x,y) = (2,3),(1,2),(0,1),(4,0),(3,4)$; $x-y \equiv -1,-1,-1,4,-1 \equiv 4$ ✓

3rd col : $(x,y) = (3,3),(4,4),(2,2),(1,1),(0,0)$; $x-y \equiv 0$ ✓

4th col : $(x,y) = (1,0),(0,4),(4,3),(3,2),(2,1)$; $x-y \equiv 1,-4,1,1,1 \equiv 1$ ✓

5th col : $(x,y) = (3,1),(2,0),(1,4),(0,3),(4,2)$; $x-y = 2,2,-3,-3,2 \equiv 2$ ✓

Sum of elements in any row or col $= \Sigma(x+5y+1) =$

$= 10+50+5 = 65$.

$\begin{pmatrix} 1, & -1 \\ 1, & -2 \end{pmatrix}$

$a+b=2$
$a-b=0$
$a'+b'=-3,\ a'-b'=1$

$ab'-a'b=-1$

For upper diagonal : 11, 12, 13, 14, 15.

$(x,y) = (0,2),(1,2),(2,2),(3,2),(4,2)$;

Lower diagonal (17, 5, 13, 21, 9)

$(x,y) = (1,3),(4,0),(2,2),(0,4),(3,1)$.;

$(a \pm b)x + (a' \pm b')y = c$.

middle cell $= (3,3)$

$i = (1-1+1)m,\ j = (1-1+2)m$,

$i = 2,\ j = 4$. $\rightarrow (3,5)$ in this our notation //

already associated

skewly related cells (x,y), (x',y')

$2m+2-x,\ 2m+2-y$

$6-x,\ 6-y$

$(5,1)$

J. Chem. Phys. 8 (5/40). p. 403 – 3 articles on hindered rotation

---

Trans. Roy. Soc. No. 798. Vol 238, p. 513–48 (24/5/40)

E. W. Kellermann – Theory of the vibrations of the NaCl lattice

– Problem suggested by Prof. Born. acknowledgement to Dr. Fuchs

---

J of Phys (U.S.S.R) (new Journal):

Vol 2. No. 1. (1940). p. 49. Frenkel – Plastic deformation

---

p. 55. Frenkel & Cherdyncev – Gaseous model of atomic nuclei.

– Ref to Bethe-Bacher, Frenkel's wave mechanics

---

p. 65. I. Pomeranchuk – energy of cosmic ray electrons in Earth's magnetic field (Uses Dirac's eqn of motion) – acknowledgement to Landau & Tamm

---

Two diagonal method (Note Book) (3,5)

Bk. 16

17	24	1	8	15
23	5	7	14	16
4	6	13	20	22
10	12	19	21	3
11	18	25	2	9

For $\begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 1, -1 \\ 1, -2 \end{pmatrix}$

Any point in cell $(3+x-y,\ 5+x-2y)$

& number given by $x+yn+1$

ie $x+5y+1$ $(n=5)$

$x-y \equiv c$ cols

$x-2y \equiv c$, ~~cols~~ rows

$(i,j) = (2,4), \begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$

$y = 0,1,2,3,4 \rightarrow 1, 6, 11, 16, 21$ at $(3,5), (2,3), (1,1), (0,-1), (-1,-3)$ $(5,4)$ $(4,2)$ corrects ✓

$y = 0,1,2,3,4 \rightarrow 2, 7, 12, 17, 22$, at $(4,6), (3,4), (2,2), (1,0), (0,-2)$

$(4,1), (3,4), (2,2), (1,5), (5,3)$ ✓

$y = 0,1,2,3,4 \rightarrow (3, 8, 13, 18, 23)$ at $(5,7), (4,5), (3,3), (2,1), (1,-1)$

$y = 0,1,2,3,4 \rightarrow (4, 9, 14, 19, 24)$ $(5,2), (4,5), (3,3), (2,1), (1,4)$ ✓

at $(6,8), (5,6), (4,4), (3,2), (2,0)$

$(1,3), (5,1), (4,4), (3,2), (2,5)$ ✓

$y = 0,1,2,3,4 \rightarrow (5, 10, 15, 20, 25)$ at $(7,9), (6,7), (5,5), (4,3), (3,1)$

$(2,4), (1,2), (5,5), (4,3), (3,1)$ ✓

$\Sigma(2m+2)$

$\Sigma\ 7+1$

$\Sigma(7-1)$

$\Sigma\ 2m$

$7 = 1$

$\Sigma 1 + 1$

[illegible] numbers given by values of (x,y) as $(0,2), (3,3), \cancel{(3,1)}, \cancel{(1,0)}, \cancel{(3,1)}, (4,4), (1,0), (3,1)$

$x-2y = (-4), (-4), (-4), (1), (1) = 1, 1, 1, 1, 1$

($x-2y = 1$ gives elements of 1st row.)

$\frac{1}{2}\{(2m+1)^2+1$

$4m^2+4m+2$

[illegible] $(x,y) = (4,1), (1,2), (3,3), (0,4), (2,0)$

$x-2y \equiv 0, 2, -3, -3, -8, 2 \equiv 2$. ie $x-2y \equiv 2$ gives second row

$(x,y) = (3,0), (0,1), (2,2), (4,3), (1,4)$; $x-2y \equiv 3, -2, -2, -2, -7 \equiv 3$.

[illegible] $\bar{1}+1+1+1+1+\bar{1}+1+1+1+\bar{1} = 1$