

# QUARTER TEN-SQUARES

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## Ten-Squares and quarter ten-squares

A tautonym was originally the same word repeated for genus and species, though in *Word Ways* it is used of a single word consisting of two identical halves, such as Wallawalla, a North American Indian people (OED). I take it that it is not necessary for the two halves to have the same meaning, ie for the semantic split to occur also in the middle. Suppose we start a 10-letter word square with a tautonym ABCDEABCDE. The second row must begin with B, say BFGHI (we will just use the first half for brevity), the third with CG, eg CGJKL, and so on:

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A B C D E
B F G H I
C G J K L
D H K M N
E I L N O

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I define a quarter ten-square as one in which this pattern is replicated precisely to the right (because the five words are tautonyms), and the definition of a word square necessarily ensures the remaining two quadrants are the same. Given an adequate supply of tautonyms, such squares are very quick to find, as they are essentially five-squares. There are, after all, only 15 letters that can be chosen independently, whereas, in a ten-square, there are 55. In computational terms, finding the ten-squares from 10-letter tautonyms within a word list can be 50 million times faster than looking for ten-squares in the complete 10-letter word list. Quick it may be, but first you must catch your tautonyms. I found almost 500 quarter squares, and these account for an estimated 29% of all ten-squares, despite tautonyms being a mere 0.2% of my 10-letter wordlist. A further 18% of ten-squares contain nine tautonyms. Almost exactly 20% of all my quarter-squares consist solely of placenames. In all, I found 123 distinct top row words, though none starting with E, F, Q, or Z.

The best-known quarter square is probably that in Borgmann's *Language on Vacation*. Arthur Holt was reputed to have a list of hundreds of 10-letter examples. Such a list would certainly have presented by far and away the easiest way to make a ten-square (although there is the issue of repeated words). I needed to find the words in order to ascertain whether they were solid, hyphenated, or two-word phrases, in order to decide how much merit the square had.

Unfortunately, my own resources, significant in some of the subject areas, delivered none of the five (and Borgmann's references on pages 199 and 212 are not easy to check). However, a search of the Internet gave some meanings different from his for some of them, but two still eluded me.

Any help would be welcome. Here is his square:

ORANG Borgmann: orang-orang Javanese name for the plant *Pouzolzia glomerata* in an Index by Watson, London 1868. *Pouzolzia* and *glomerata* are genus/species names, but I could not find them together. However, orangorang in Indonesian means 'all sorts of men' ([http://www.linguistics.ucla.edu/people/gunlogson/ling20\\_class02.pdf](http://www.linguistics.ucla.edu/people/gunlogson/ling20_class02.pdf)).

RANGA Borgmann: parsley fern, Christian: *The Caroline Islands*, London, 1899. I cannot find that, but it is a word in Maori: rangaranga. n.(under Ranga (i)) a short quick stroke in paddling, as opposed to kuumea). ([www.arts.auckland.ac.nz/maori/bbiggs/whfeb00.htm](http://www.arts.auckland.ac.nz/maori/bbiggs/whfeb00.htm)); and Te Rangaranga was a place of battle on 21st June 1864 (<http://www.digitalus.co.nz/mokomokai/hgrobley.html>)

ANDOL Borgmann: chinese fly in Foster: *An Illus Ency Med Dict*, NY 1888-94. I cannot find this independently.

- NGOTA Borgmann: town Lake Nyasa, now Kota Kota. I could not find either, but ngotangota is to be found in Isaiah 41.15 of the Maori bible ([www.christianisrael.com/maori/B23C041.htm](http://www.christianisrael.com/maori/B23C041.htm))
- GALAN Borgmann: mountain in Philippines, from A Pronouncing Gaz. and Geogr. Dict. of the Philippine Islands, War Dept, Washington, 1902. I cannot find this independently.

The validity and forms of ANDOL and GALAN are important, because without them, I found it impossible to make any ten-squares at all from the quarter of a million words that Chris Long's formula predicts should be sufficient, except for the following two, which are heavily tautonymic:

- MOCCO mocomocco, OED moco-moco  
 OOOOO O-O-O-O-O-O-O-O-O-O, Palindromicon zebra cry  
 CORRO corrocorro, OED corocoro 1798q  
 CORRO  
 OOOOO

and the square consisting of the ten identical words OOOOOOOOOO (a quarter square!). This last is a truly wonderful square, and unique, as all diagonals are also words: it's just a shame that the words are all the same, and that there are 90 hyphens in it!

Given just GALAN, one can make one more square:

- RENGARENGA Rengarenga Point, New Zealand, -38° 09', 174° 75', [www.linz.govt.nz/databases](http://www.linz.govt.nz/databases)  
 EQUALAQUAL equal-aqual Web2  
 NULLANULLA nulla-nulla, OED  
 GALANGALAN qv  
 ALANGALANG alang-alang Web2

This has the five words repeated (not all tautonymic, so not a quarter square)

Even given both ANDOL and GALAN, there are just six squares, including one quarter-square:

ORANGOTANG	ORANGUTANG	RENGARENGA	URANGUTANG	WHANGWHANG
RANGARANGA	RANGARANGA	EQUALAQUAL	RANGARANGA	HUNGAHUNGA
ANDOLANDOL	ANDOLANDOL	NULLANULLA	ANDOLANDOL	ANDOLANDOL
NGOTANGOTA	NGOTANGOTA	GALANGALAN	NGOTANGOTA	NGOTANGOTA
GALANGALAN	GALANGALAN	ALANGALANG	GALANGALAN	GALANGALAN
ORANGOTANG*	URANGUTANG	RANGARANGA	URANGUTANG	WHANGWHANG
TANGATANGA	TANGATANGA	EQUALAQUAL	TANGATANGA	HUNGAHUNGA
ANDOLANDOL	ANDOLANDOL	NULLANULLA	ANDOLANDOL	ANDOLANDOL
NGOTANGOTA	NGOTANGOTA	GALANGALAN	NGOTANGOTA	NGOTANGOTA
GALANGALAN	GALANGALAN	ALANGALANG	GALANGALAN	GALANGALAN
all-tautonymic	—	—	all-tautonymic	all-tautonymic
—	—	—	—	quarter-square

\* or ORANGUTANG, which means the square is not tautonymic

The sources (not already given) for the six squares above are:

- TANGATANGA Tangatanga, Bolivia, -19° 39', -68° 35', NIMA  
 ORANGUTANG orangutang, OED orang-outang  
 URANGUTANG urang-utang, OED  
 WHANGWHANG whang-whang, OED whang 1889q  
 HUNGAHUNGA Hungahunga, New Zealand, -37° 68', 175° 73', source as for Rengarenga above

### Best Quarter Ten-Squares

Because of the paucity of quarter-squares with a mere 250,000 10-letter words, I expanded the vocabulary for the remainder of this article, principally with place names, to get the following results. In the following, qv for a source means that the source has already been given, including in the material above. Place names are from the NIMA database unless otherwise indicated. ITIS is a database of the USDA. In the many cases where a word has multiple meanings (or locations), I have selected one. For the source of New Zealand place names, please see Rengarenga above. I cannot find the exact forms of two words, so I simply attribute them to Borgmann (see above). I found 103 quarter squares consisting solely of place names – about 20% of all quarter squares.

Squares consisting solely of place names are marked with an asterisk.

I evaluated the squares, scoring less for proper nouns, phrases, and so on. The best of the 500 in my view follow, only the first (actually a pair) being given in full. In the second example, note that all five vowels are possible in the second position of LANGA.

ANTINANTIN antin-antin, OED, anting-anting 1900q  
 NDALANDALA Nderlandala, Fiji, -16° 53', 177° 26', or NTALA Ntalantala, South Africa, -28° 53', 30° 04'  
 TAUANTAUAN Tauantauan Creek, Philippines, 8° 02', 124° 57'  
 ILANGILANG ilang-ilang Web2  
 NANGANANGA Nangananga, Madagascar, -22° 21', 47° 21'  
 ANTINANTIN  
 NDALANDALA  
 TAUANTAUAN  
 ILANGILANG  
 NANGANANGA

CLANG clang-clang, OED clang  
 LANGA Mount Langalanga, Papua New Guinea, -5° 06', 150° 06', or LENGA Lengalenga, Tanzania, -10° 42', 34° 42', or LINGA Lingalinga, Dem Rep Congo, -1° 23', 19° 15', or LONGA Longalanga, Dem Rep Congo, -2° 14', 26° 17', or LUNGA Lungalunga, Papua New Guinea, -4° 13', 151° 59'. Note all five vowels are possible.

ANDOL Borgmann

NGOTA qv

GALAN Borgmann

HANGI Hangihangi, New Zealand, -35° 80', 173° 78'

ALGAL algal-algal, Web2

NGILA qv

GALAN Borgmann

ILANG qv

ILANG qv

MANGI Naivi Mangimangi, Fiji -19° 02', 178° 25'

LANGA qv, five possibilities

ALGAL qv

ANDOL Borgmann

NGILA qv

NGOTA qv

GALAN Borgmann

GALAN Borgmann

ILANG qv

SANGA sanga-sanga Web2, or Sangasanga Island, Fiji, -18° 08', 178° 35'

ALGAL qv

NGILA qv

GALAN Borgmann

ALANG qv

SANGI Batu Sangisangi, Indonesia, -4° 10', 123° 12' or TANGI Tangitangi Creek, Fiji, -17° 26', 177° 48'

ALGAL qv

NGILA qv

GALAN Borgmann

ILANG qv

WALLA walla-walla, OED

ANDOL Borgmann

LDING Ldingding, Cameroon, 10° 55', 13° 45'

LONGA qv

ALGAL qv

WANGI Pulau Wangiwangi, Indonesia -5° 20', 123° 35'  
 ALGAL qv  
 NGILA Ngilangila Island, Fiji -19° 07', -178° 33'  
 GALAN Borgmann  
 ILANG qv  
 YLANG ylangyang, OED  
 LANGA qv see above for AEIOU  
 ANDOL Borgmann  
 NGOTA qv  
 GALAN Borgmann

### Top Row Words with most Quarter Ten-Squares

Here are 27 squares beginning with INGITINGIT:

INGIT Ingit Ingit, Indonesia, 0° 41', 103° 32'  
 NDALA qv  
 GALAN Borgmann  
 ILANG qv  
 TANGA qv, or TANGE Tangetange, Solomon Islands, -8° 04', 156° 52', or TANGI qv  
 \*INGIT qv  
 \*NDARA Ndarandara Creek, Fiji, -16° 35', 179° 49'  
 \*GABON Mount Gabongabon, Philippines, 8° 39', 125° 47'  
 \*IRONG Irongiron Point, Philippines, 11° 51', 124° 49'  
 \*TANGA qv, or TANGE qv, or TANGI qv  
 \*INGIT qv  
 \*NDARI Ndarindari, Fiji, -16° 39', 179° 18'  
 \*GABON qv  
 \*IRONG qv  
 \*TINGA Tinga-Tinga, Mozambique, -23° 42', 35° 21', or TINGI Tingitingi, Dem Rep Congo, -3° 42', 26° 56'  
 \*INGIT qv  
 \*NDOBA Ndoban-doba River, Swaziland, -26° 51', 31° 55'  
 \*GOBOL Gobolgobol, Somalia, 9° 36', 46° 42'  
 \*IBONG Ibongibong Point, Philippines, 14° 27', 120° 25'  
 \*TALGA Talga Talga Mining Centre, Australia, -21° 01', 119° 49'  
 INGIT qv  
 NGALI Ngalingali, Fiji, -18° 56', -178° 56'  
 GALAN Borgmann  
 ILANG qv  
 TINGA qv, or TINGI qv  
 INGIT qv  
 NGALO Ngalongalo River, Fiji, -16° 47', 179° 31'  
 GALAN Borgmann  
 ILANG qv  
 TONGA Tongatonga Creek, Fiji, -18° 03', 177° 38', or TONGI Tongitongi, Fiji, -17° 57', 177° 31', or TONGO tongotongo, ITIS plant  
 \*INGIT qv  
 \*NGARE Ngarengare Island, Solomon Islands, -8° 38', 158° 07'  
 \*GABON qv  
 \*IRONG qv  
 \*TENGA Tengtenga, Niger, 18° 34', 13° 07', or TENGE Tengetenge, Dem Rep Congo, -4° 23', 27° 26'

\*INGIT qv  
 \*NGARI Ngarinari Island, Solomon Islands,  
 -8° 28', 157° 54'  
 \*GABON qv  
 \*IRONG qv  
 \*TINGA qv, or TINGI qv

\*INGIT qv  
 \*NIARA Niara Niara, Mali, 15° 11', -10° 49'  
 \*GABON qv  
 \*IRONG qv  
 \*TANGA qv, or TANGE qv, or TANGI qv

\*INGIT qv  
 \*NTARE Ntarentare, Tanzania, -2° 32', 30° 29'  
 \*GABON qv  
 \*IRONG qv  
 \*TENGA qv, or TENGE qv

Here are 21 squares beginning with UNGAS:

UNGAS Ungas Ungas, Philippines, 4° 40', 119° 28'  
 NDALA qv  
 GALAN Borgmann  
 ALANG qv  
 SANGA qv, or SANGI qv, or SANGO  
 Sangosango Creek, Fiji, -16° 42', 179° 26'

UNGAS qv  
 NDARI qv  
 GALAN Borgmann  
 ARANG qv  
 SINGA Singasingau Creek, Fiji, -16° 54', 178° 44'

UNGAS qv  
 NGARE qv  
 GALAN Borgmann  
 ARANG qv

SENGA Monte Senga-Senga, Mozambique, -17° 32', 33° 07', or SENG I Sengisengi, Sierra Leone, 8° 55', -10° 37', or SENGO Sengo Sengo, Mozambique, -18° 49', 34° 01'

UNGAS qv  
 NGARI qv  
 GALAN Borgmann  
 ARANG qv  
 SINGA qv

UNGAS qv  
 NTALA qv  
 GALAN Borgmann  
 ALANG qv  
 SANGA qv, or SANGI qv, or SANGO qv

\*INGIT qv  
 \*NGORA Ngorangora Point, Solomon Islands,  
 -9° 42', 161° 59'  
 \*GOBOL qv  
 \*IRONG qv  
 \*TALGA qv

INGIT qv  
 NTALA qv  
 GALAN Borgmann  
 ILANG qv  
 TANGA qv, or TANGE qv, or TANGI qv

UNGAS qv  
 NDARA qv  
 GALAN Borgmann  
 ARANG Arangarang, Indonesia, -1° 36', 103° 48'  
 SANGA qv, or SANGI qv, or SANGO qv

UNGAS qv  
 NGALI qv  
 GALAN Borgmann  
 ALANG qv  
 SINGA qv

UNGAS qv  
 NIARA qv  
 GALAN Borgmann  
 ARANG qv  
 SANGA qv, or SANGI qv, or SANGO qv

UNGAS qv  
 NTARE qv  
 GALAN Borgmann  
 ARANG qv  
 SENGA qv, or SENG I qv, or SENGO qv

The next most common top row words are ANTINANTIN (18 quarter squares), ALANGALANG (12), and ABANGABANG (10).