A PALINDROMIC ALPHABETIC INSERTION

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An alphabetic insertion occurs when each letter of the alphabet is inserted in turn in the same position within an n-letter word, forming 26 new words of length n+1. Alphabetic insertions are extremely difficult to find, even for the simplest case in which letters are in turn inserted in the center of a two-letter word. As a practical matter, the only alphabetic insertions with any hope of success are those in which the original word consists of two vowels; letting x and y stand for vowels, the 26 words sought are of the form xay, xby, xcy, ..., xzy.

If the two vowels are the same, then one has a palindromic alphabetic insertion. My first attempt to construct a palindromic alphabetic insertion involved the word EE, a Scottish form of 'eye' (Web 3). After much searching I was able to locate 25 of the needed words, lacking only EOE. The editor informs me that EOE may be difficult to find. Fred J. Kathman, known as Cincinnatus in the National Puzzlers League, asked fellow-members for an EOE reference in the June 1925 Enigma, offering a reward of one dollar. Apparently no one ever collected, despite the fact that three word-lists of 3-letter words were then in existence, plus the manuscript of an unpublished one containing 5000 3-letter words from 167 references compiled a decade before.

Encouraged by this near-success, I turned my attention to AA, a type of rough, scoriaceous lava (Web 3). In the initial stages this proved even more difficult than EE, but one by one the gaps were filled (the last, ACA, thanks to Philip Cohen) and the following alphabetic insertion emerged.

AAA chief of the signet-bearers in the land of Kens (An Archaic Dictionary, W. R. Cooper)
ABA an altazimuth or either astronomical or terrestrial use (Web 3)
ACA variant of 'Aka', the name of a pygmy group in Central Africa (The New Century Cyclopedia of Names, Appleton-Century-Crofts, 1954)
ADA a village in Hardin county, north-west Central Ohio (Webster's New Geographical Dictionary, 1972)
AEA the chief town of ancient Colchis, now called Kutaisi (Webster's New Geographical Dictionary)
AVA the chief town of ancient Colchis, now called Kutaisi (Webster's New Geographical Dictionary)
AWA a river in Tahiti (Times Index-Gazetteer, 1965)
AXA an
AYA the
AZA ancient

Incidentally, IYI and IZI don't anyone help.

Alphabetic and alphabetic insertions are created for example
Incidentally, my I-I series has IAI, IEI, IGI, III, IPI, I0I, IUI, IXI, IYI and IZI missing, and O-O lacks only O00, OQO and OZO. Can anyone help?

Alphabetic insertions are closely related to alphabetic beheadments and alphabetic curtailments; for several three-letter examples, see "Alphabetic Trilliter-als" in the May 1972 issue. If rearrangement of the letters is permitted after insertion, then alphabetic transadditions are created - see my article with this title in the May 1980 Word Ways for examples.

AJA a town in Lower Egypt, also called Aga ([The Columbia-Lippincott Gazetteer of the World], 1952)
AKA any of several species of a woody New Zealand vine (Web 3)
ALA a side apartment or recess in a Roman house (OED)
AMA the float of a Hawaiian outrigger canoe (Web 3)
ANA notes and scraps of information relating to a person or place (OED)
AOA the name of a town and bay in American Samoa (Times Index-Gazetteer)
APA a valuable timber tree of the Guianas and northern Brazil (Web 3)
AQA in 'Aqa Hasan', a populated place in Iran ([Official Standard Names Gazetteer of Iran])
ARA a genus of macaws (Web 3)
ASA a Biblical king of Judah (Web 2)
ATA predominantly pagan people living near Mt. Apo in central Mindanao, Philippines (Web 3)
AUA an island in the Bismarck Archipelago, West Pacific ([Times Index-Gazetteer])
AVA variant of 'kava', an intoxicating beverage of central Polynesia (Web 3)
AWA 18th-19th century Scottish form of 'away' (OED)
AXA a name appearing in the Douay Bible (Web 2)
AYA the consort of Shamash in Babylonian religion (Web 2)
AZA another name found in the Douay Bible (Web 2)