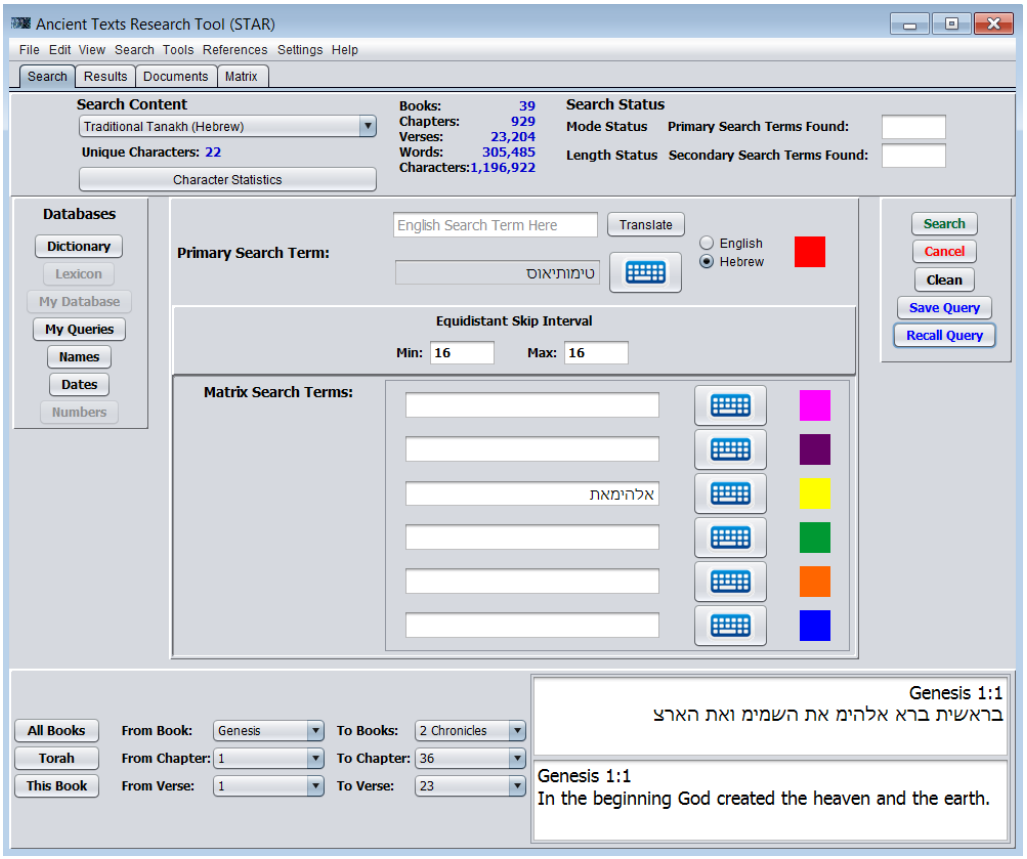
Ancient Texts Research Tool (STAR)

User Manual

Supporting Initial Software Release Version 1.*.*



Last User Manual Update: January 1st, 2018

1 Change Log

Date	Author	Changes	Version
03/02/2017	Sawyer	Initial version to support STAR initial release	V 1.0
01/01/2018	Sawyer	Updates for V 1.2.0 (non-symmetric diagonal searches)	V 1.1

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2 Overview

2.1 Document Scope

This document provides the User Manual for the initial release of STAR V 1.*.*. This manual will be updated with each subsequent incremental release of the software in the V 1.*.* series (e.g., V 1.1.0, V 1.2.0, etc).

If you have yet to install STAR, please reference the STAR Installation Guide.

2.2 Background and Philosophy

The STAR tool that you now have in your hands was driven by those in the "code cracker" community (which you may be a part of) to vett some of the recent findings presented in the 2017 book, *The Chamberlain Key* (CK). Some of the findings presented in the book (and their impact) are so phenomenal, we sought further proof. Much of the findings were based on a previous software tool that has since aged and provided us no means to inspect the underlying data sets nor the actual software code used in producing the results and statistics.

We have attempted to take a very "agnostic" approach on either side of the argument as to whether certain ancient Hebrew texts have embedded encryptions within them. Our goal with this tool has been to provide one as open as possible for you to make your own judgements as to what is *phenomenal* and what is *random chance*. We have taken particular care in developing our statistics algorithm and how the predicted chance of any result is presented. We provide a summary mode and a "research mode" so that those who really want to dig and question what is happening under the hood know exactly how the probabilities are formulated. If we got it wrong, I'm sure we'll hear from you.

Although we found the legacy tools to be superb products, they lacked several features the community was seeking to further explore the CK findings. One particular feature is a simple "copy and paste" function (i.e., the ability to copy a search term from another source like a browser, and paste it into the search term field), that is present today in nearly all software products. One particular use case presented to us was the need to copy translated terms from Google Translate running in browser into the tools search field. We went one step farther by actually incorporating Google Translate right into the tool.

A premium was also placed on providing the capability of importing documents of any type into the tool for inspection of intentional encryptions. The legacy tools had no means to decrypt from documents like the Leningrad Codex or even the novel *War and Peace*. For those of you familiar with the legacy tools, you'll notice additional features such as our "social media" and

data sharing built into the STAR framework. We have provided the ability to share your results, your queries, and all of your underlying databases with your friends and research partners in order to facilitate research via social media and a globally connected scale.

Another major driver of STAR has been based on the need to test for other encryption mechanisms embedded in ancient texts beyond basic equidistant letter sequences. We have created a flexible architecture with our product that will enable us to add new search engines to test the presence of other encryption mechanisms (e.g., DNA profiles, error correction codes found in modern day communications, steganography, etc.). Basic logic tells us that if an omnipotent and omniscient God placed encryptions in a text, He would have the ability to employ (if He wished) an infinite number of mechanisms for us to discover.

STAR has been written in Java to provide the greatest flexibility moving forward with the tool and target platforms (e.g., basic Windows desktop/laptop, Mac, Linux server, and/or Android Smartphone/tablets). Although performance has been sacrificed by this choice of coding language, we believe that the wider platform target options will increase the overall research effort by enabling more individuals to utilize the tool, contributing their own unique findings and theories.

2.3 Readiness State of the Software

Given our limited resources, we have attempted to optimize the "bang for the buck" in capabilities with this product. Your purchase and that of many others will aid us in our ability to continue developing this tool. We would consider V 1.1.* of the software more of a Beta version of the tool. We have avoided "polishing the turd" in order to put this product in your hands for feedback. We look forward to polishing the look and feel aspects of the User Interface and to incorporate more advanced decryption algorithms after receiving your feedback.

2.4 Taking Ownership

STAR has been created for you as a serious research tool to aid the community of "code crackers" for sifting through the truth and fiction of "encryptions" discovered in ancient texts. Don't be shy in requesting new features and reporting bugs you find. If you have a need to ingest other manuscripts, please let us know, so that we can turn on the advanced import features. It may be that the particular document you are seeking is eventually added to our default installation for the entire community.

You may desire other reference tools (e.g., the Hebrew Interlinear Bible) be embedded into STAR. We are open to that, especially if we know the wider user community also desires the same feature.

3 How Best To Use this Manual (and other resources)

3.1 Styles and Conventions

3.1.1 Use of Italics

Italics are used when describing GUI components, such a pane, menu, button, or dialog. For example, the *Search Pane* and the *Help Menu.*

3.2 Tricks of the Trade and Geek Speak

Throughout the document, you'll see references to what we call *Tricks of the Trade*. These are handy shortcuts that you may want to memorize as you become a STAR power user. When you see our artisan hammer, lookout for a fancy shortcut that may make your research effort much easier.

Occasionally, you will also see our little callout for *Geek Speak*. This is our way of letting you know that we've added details that may be of interest to our power users computer scientist enthusiasts, but of no interest to recreational users. Feel free to ignore our *Geek Speak* sections if you have little interest in the technical details of what is going on under the hood of this Java application.

3.3 Graphical User Interface (GUI) Terms

This section provides a quick tutorial on the basic terms that we'll be using to describe the Graphical User Interface (GUI) throughout the document.

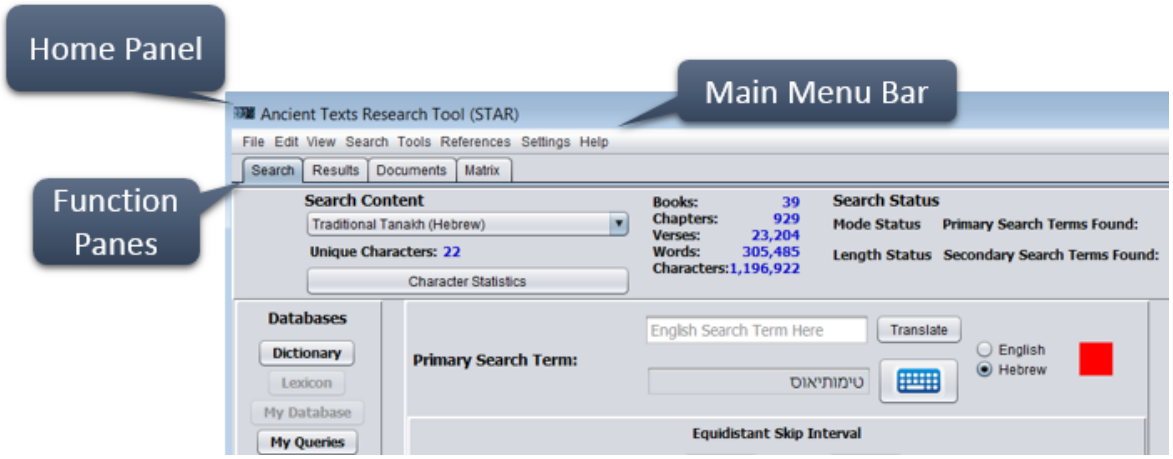


Figure 1

3.3.1 Home Panel

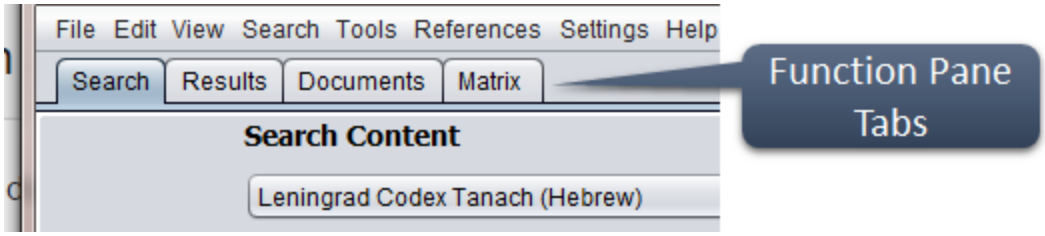
Figure 1 above provides a pic showing three of the key elements of your **Home Panel**. The Home Panel is the main control panel (aka frame) that is displayed after the tool initializes. From here, you will be able to access all the functions of STAR.

3.3.2 Function Panes

On the Home Panel you will find four primary **Function Panes** and the **Main Menu Bar**. Both the tabbed function panes and the main menu bar provide methods for you to display and navigate around the functions and tools available with STAR. A *Function Pane* provides a completely separate view of the STAR tool when it is selected. The four Function Panes are summarized as follows:

- **Search:** Primary Function Pane for performing search
- **Results:** Displays search results in a table
- **Documents**: Provides a side by side view of the loaded reference documents being searched
- **Matrix:** Pane for displaying results matrix for EDLS searches

3.3.3 Function Pane Tabs



You can display one of four Function Panes by selecting any of the Function Pane Tabs on the *Main Home Frame*. These tabs will always remain visible on the *Home Frame* to enable you to quickly navigate between the functions.

In some cases, depending on your preference settings, navigation between tabs may happen automatically (e.g., after search, the the *Results Pane* will display automatically). You have the ability to change that behavior to your liking under the **Settings** ⇒ **Preferences Menu**.

3.3.4 Main Menu Bar

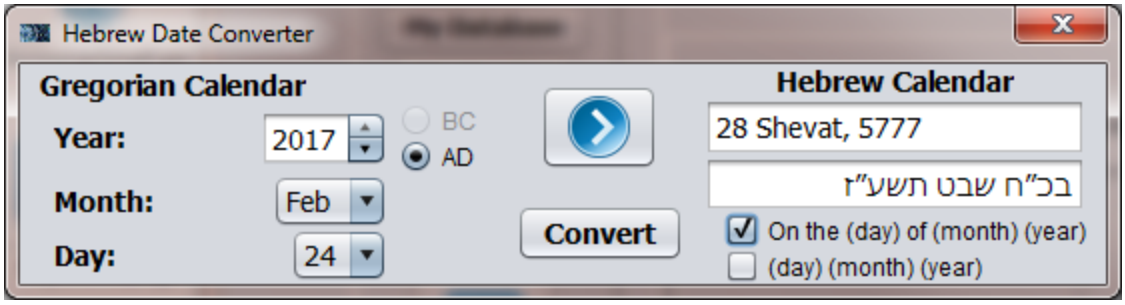
The *Main Menu Bar* at the top of the *Home Panel* is organized like most traditional software apps. Take time to explore each menu. Here is a quick summary of what you will find under each pull down menu. A more complete description of all these functions is explained in the

functional task descriptions.

- **File:** Import and Export functions
- **Edit:** Handy traditional copy and paste functions
- **View:** Tools to display and hide panel elements
- **Search:** Advanced search functions
- **Tools:** Handy navigation to tools such as Dates and Translate
- **References**: Quick navigation to reference items like Name, Dictionary, and useful links
- **Settings:** GUI Look and Feel, Preference Settings
- **Help:** Version information and links to this User Manual

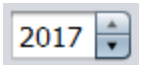
3.3.5 Dialogs

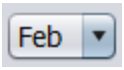
The STAR app makes generous use of dialogs throughout. The Hebrew Date Converter shown in the snap below provides an example of one of the many dialogs that will pop up on your screen when you select a particular STAR function.

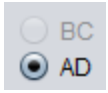


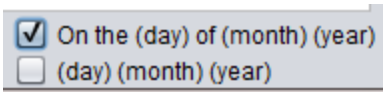
3.3.6 Controls

This particular dialog also provides a good sampling of the many types of GUI control elements we use in STAR and which we will reference throughout the User Manual:

- **Spinner:** Shown above holding the year selection 

- **Combo Box:** Used above for the Month and Day selections 

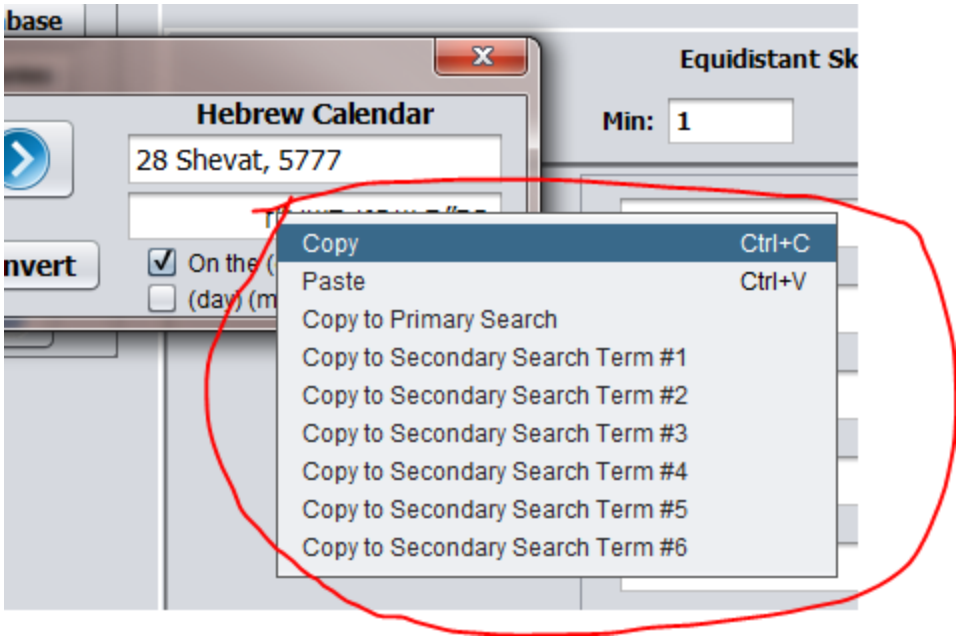
- **Radio Button:** As shown above, used to toggle between BC and AD. 

- **Check Box:** As shown above, used to toggle between date formatting selections 

- **Button:** Two examples of buttons are shown above, the “Convert” button 

and the button with the arrow 
- **Input Text Fields:** Two examples are shown above that enable you to enter text, or in some cases, to copy results 

Speaking of *Input Text Fields*, never be shy in performing a right-mouse click within the text field. You never know what may lie below until you do. Many useful shortcuts for moving results from one section of STAR to another can be performed simply with a right-mouse click!



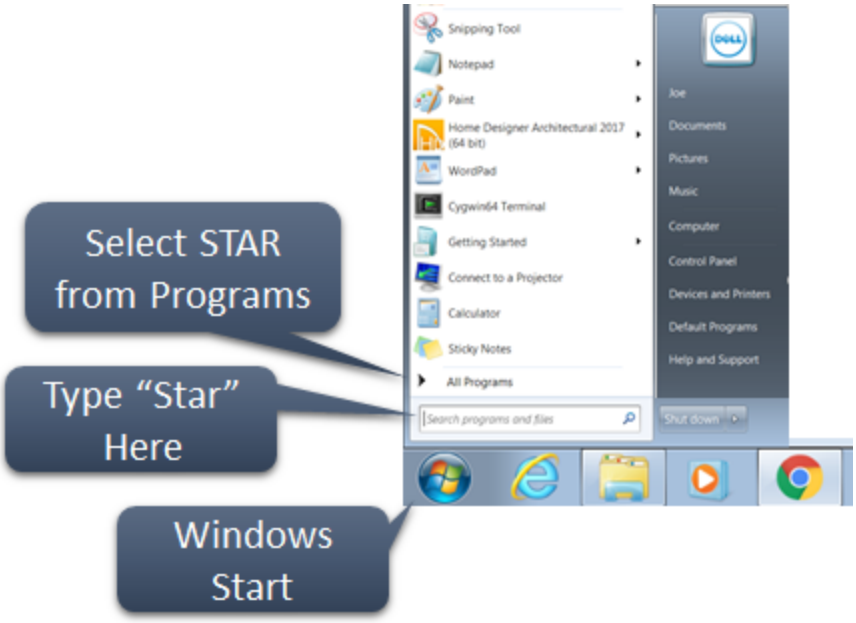
4 Quick Start

Before drilling into a particular research task, you may want to become familiar with some of the basic and most important features of the STAR tool:

- Starting the App
- Performing a Search
- Exploring Results
- Viewing Documents
- Exploring the Matrix

Without going into the nitty gritty details (and all the advanced features of STAR), we'll walk you through a few quick steps that will help you to quickly get up to speed with the basic features of STAR.

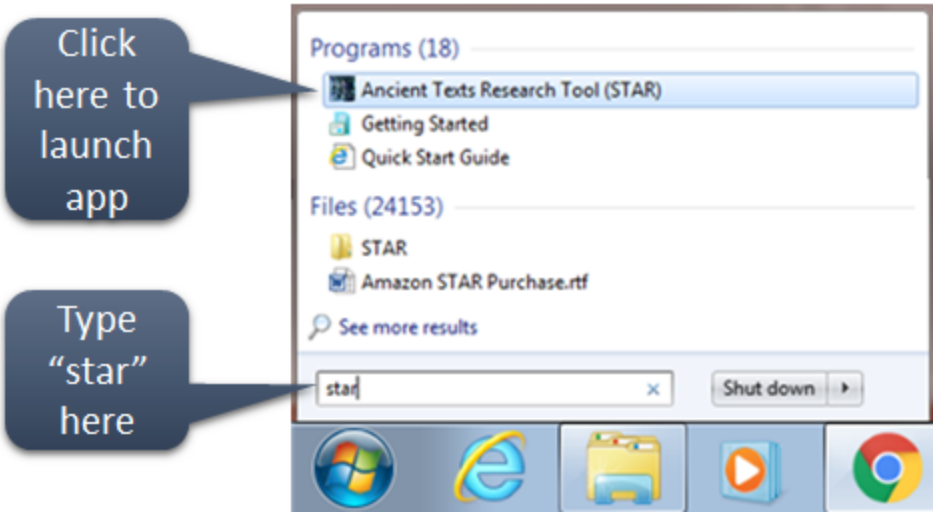
4.1 Starting the App



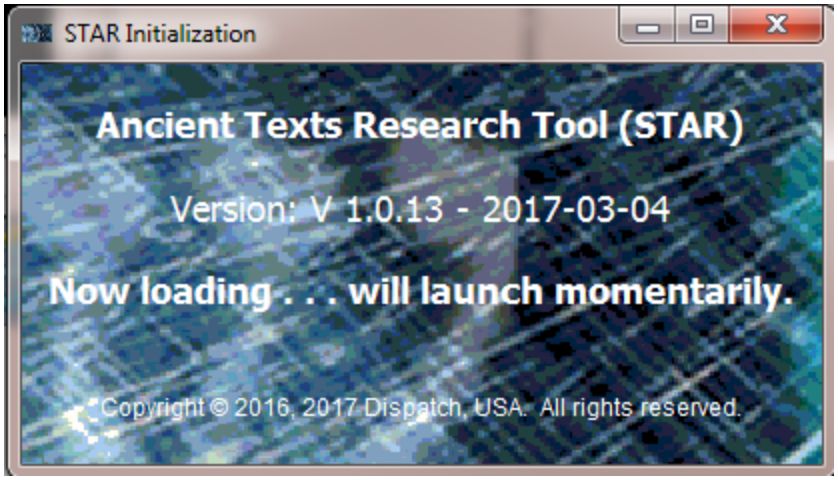
There are several methods to start STAR, similar to any other application you may have installed on your system. The snap shown above provides an example with an installation of STAR on a Windows 7 desktop. After clicking the Windows Start icon on the bottom left of your desktop, you can either type "start" directly into the "*Search programs and files*" field, or select the program using the *All Programs* navigation menu.

If you navigate the via the *All Programs* menu, you will find STAR in the alphabetized listing of your programs. You will need to navigate into the STAR folder and then select the App "Ancient Texts Research Tool (STAR)" as shown below.

Conversely, if you simply type the “star” into the “Select Programs and files” field as shown below, you will be prompted with a list of several apps from which you can select STAR.



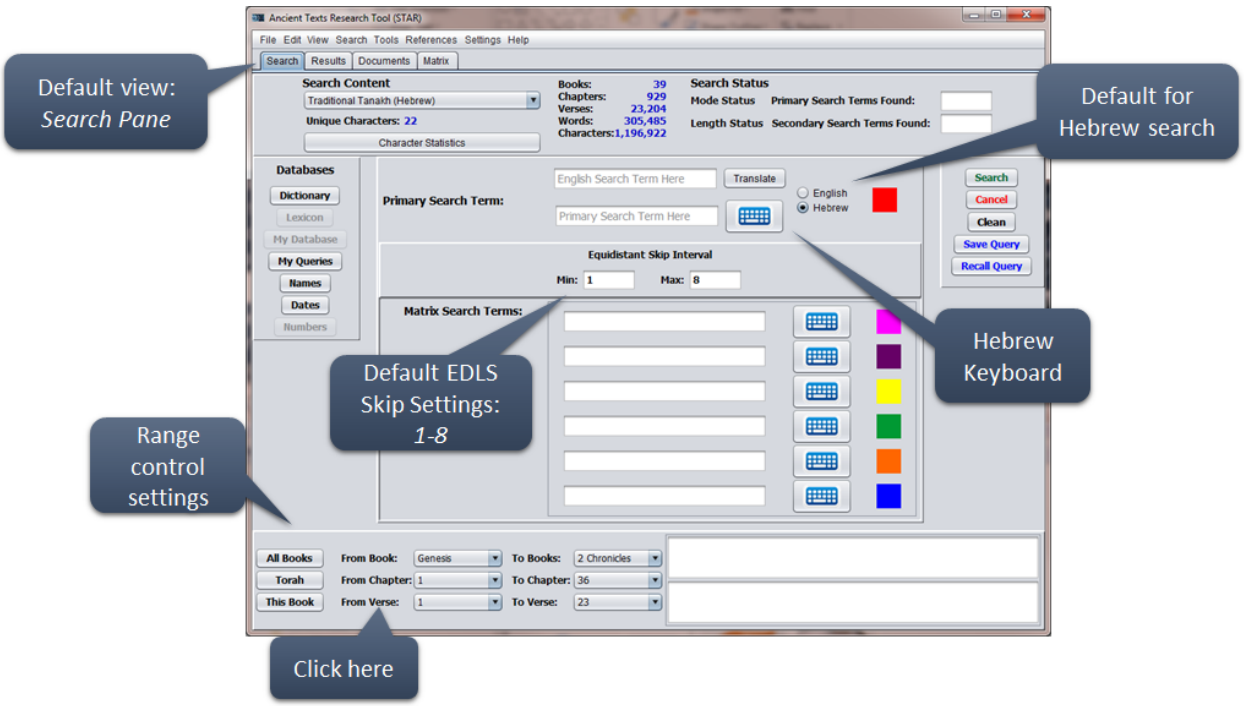
Upon launch of the app, the *STAR Initialization Dialog* will appear to let you know the app is loading. This may take from 10 to 20 seconds depending on your computing resources.



During app launch, STAR is ingesting the default reference source text files that includes the letter sequence search array, the Hebrew and English reference documents, and the reference databases that include your saved queries, the Dictionary, Names database, etc..

4.2 Search

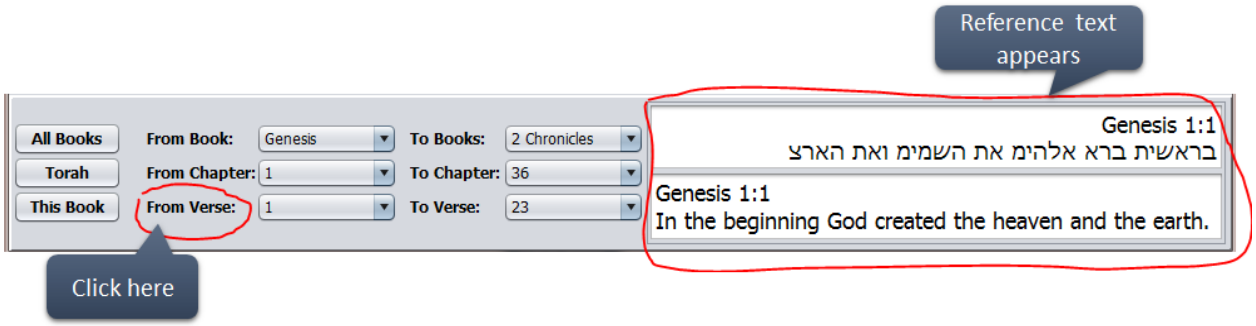
Once the app is initialized, you will be presented with the *Main Home Panel* defaulted to the *Search Pane* as shown.



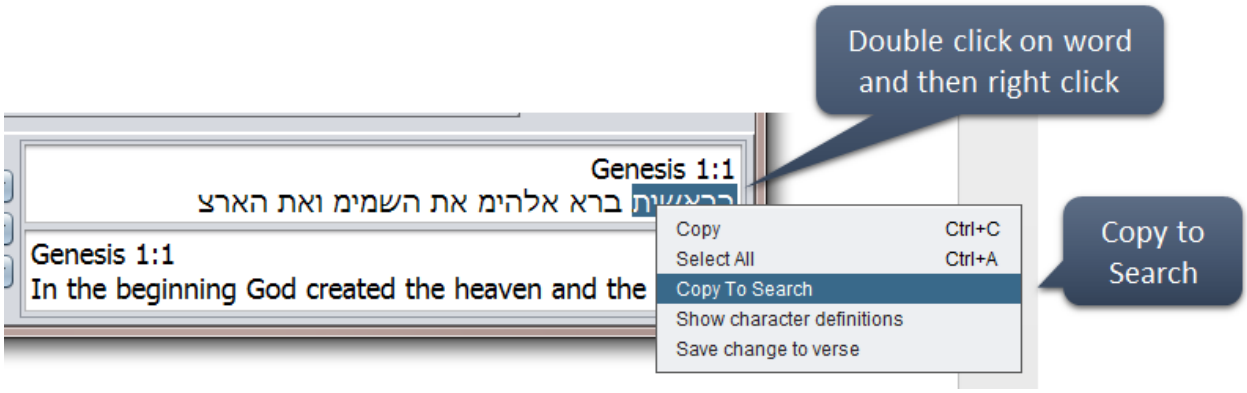
For this *Quick Start Tutorial*, we'll only touch on a few components of the *Search Pane* to get you moving with your first search. The app starts with the *Traditional Tanakh* as your default search text in Hebrew search mode. That means that you will be searching Hebrew text with Hebrew search terms. The Search Pane is defaulted to evaluate EDLS skips between 1 and 8, i.e., it will search for the presence of your Hebrew search term using a matrix of column length 1, then a matrix of column length 2, and so on, until it has evaluated all matrixes up to the final column length of 8 (for this default scenario).

The tool will create matrices from the range settings you establish in the *Range Control Settings* shown on the lower portion of the *Search Pane*.

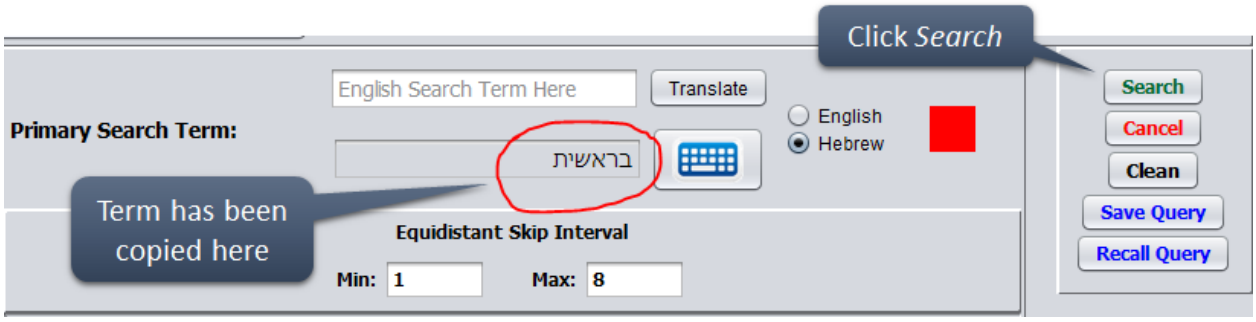
To enter a search term, you can use the Hebrew Keyboard by selecting our little Hebrew Keyboard icon, or in this case, we want you to learn a quick trick by clicking on the text label "From Verse" as shown in the snap. By clicking on either of these labels, you will be presented with the reference text of the verse selected via your range controls.



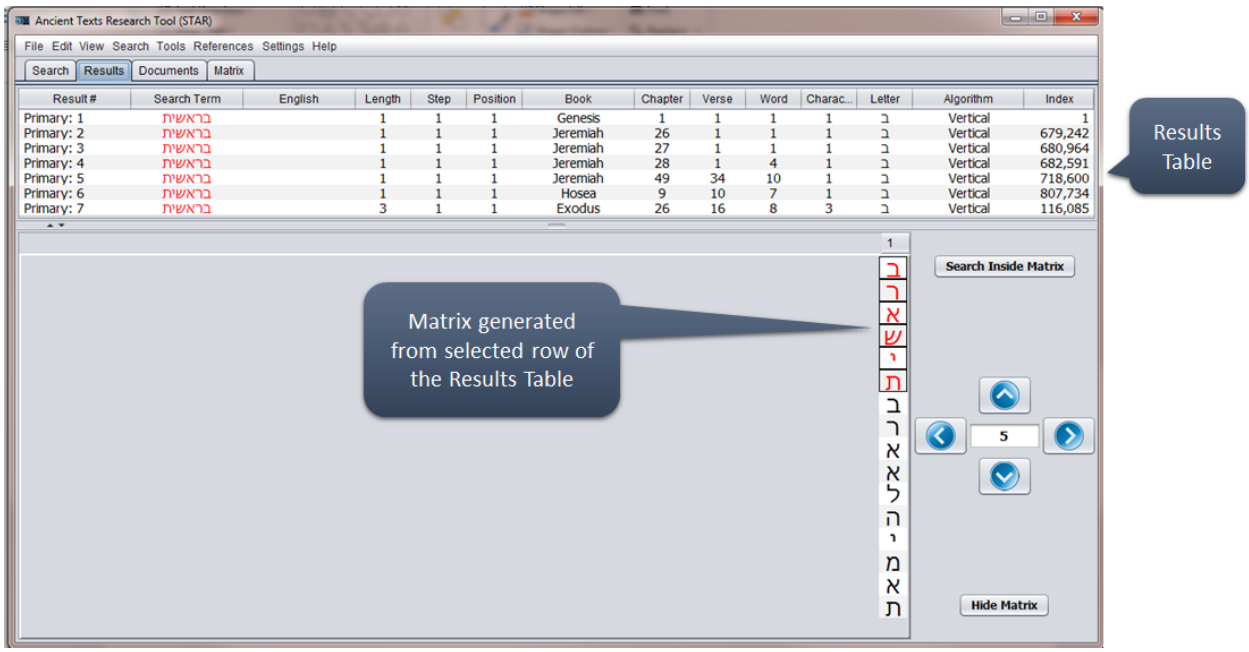
With the first verse of Genesis now in your reference text view, double click on the first word of the verse (so that it becomes highlighted), right mouse click, and select "*Copy to Search*" as shown in the snap below



You should find that the search term has been properly copied to the *Primary Term Search Field* as shown.



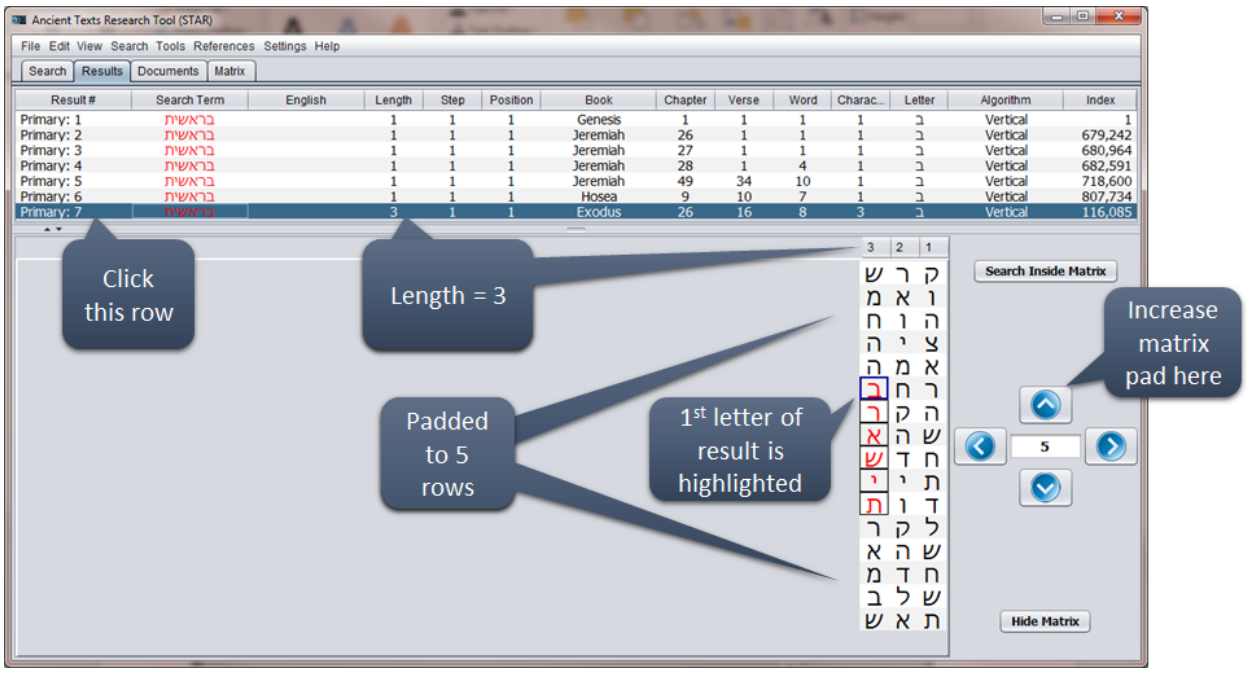
Now click the *Search Button* to begin a search. This search of a maximum EDLS length of eight (8) will complete very quickly, and on its conclusion, will automatically navigate the view to the *Results Pane* as shown. Congratulations, you have just completed your first search with STAR!



4.3 Exploring Results

The Results Pane provides a display of both the Results Table and the corresponding matrix. The matrix shown in the lower half of the Pane is constructed based on the row you have selected from the Results Table.

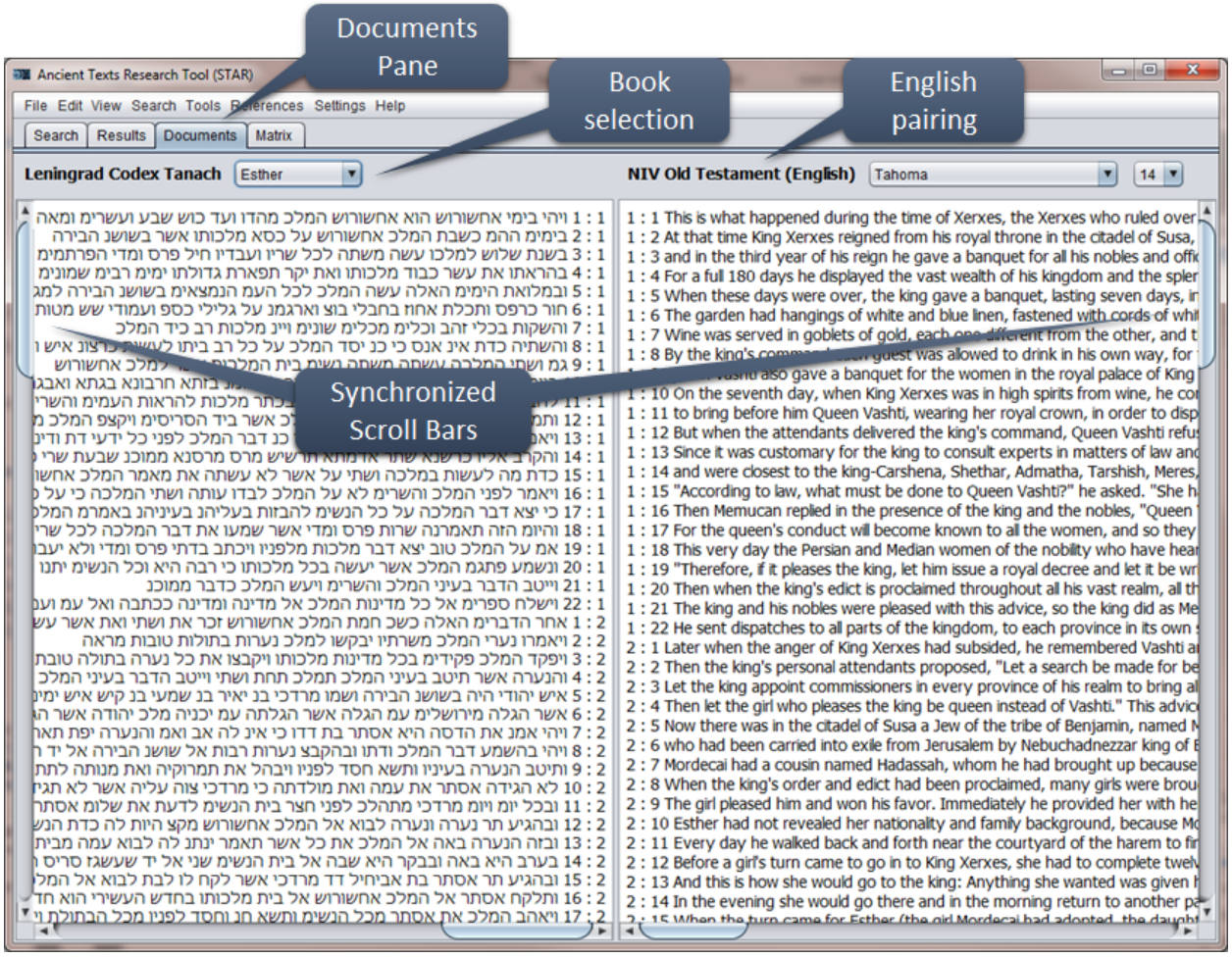
This first primary result (i.e., *Primary: 1*) is displayed on default, and simply shows that the first word of Genesis, which was your Primary Search Term, has been found beginning in the book of Genesis, Chapter 1, Verse 1, Word 1. It was found at the very first index of the letter sequence, Index 1. This may not be a very interesting result, because it is exactly what we should expect because the word has been found at a matrix column length of one (1). A column length of one indicates that the search looked for each consecutive letter of your search term at a skip distance of one (1), which is nothing more than the overt text. To see a more interesting result, select the last row of the table, *Primary :7*.



In this view, you should notice that a matrix of three (columns) has been generated, with the search term בראשית shown vertically in the third row of the matrix, padded by five (5) rows above and below the result. The first letter of the search term, the Bet 'ב', is distinguished in the matrix with the border in **navy blue** and the font color **red**. You can increase the size of the viewable matrix by the up arrow  , and conversely you can decrease your matrix viewing size by selecting the down arrow  .

There are countless other features of this Pane that are described in the detailed functional description of the *Results Pane*.

4.4 Documents Pane

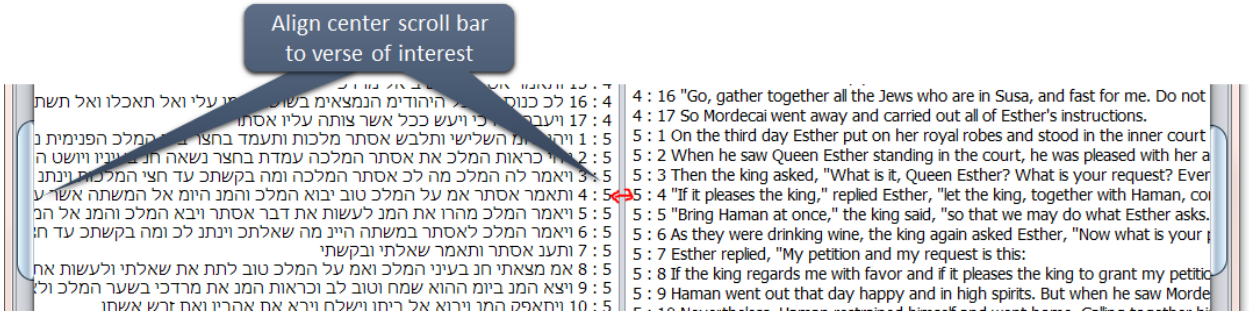


The *Documents Pane* provides a view into the underlying document reference of the source text that you are testing for encryptions. You can easily navigate to the Pane by selecting the "Documents" tab as seen above in the snap. Book selection is made via the ComboBox to the upper left of the screen. Scroll bars are provided to the sides and on the bottom.

To the right of the pane, you can see how the Hebrew version has been paired with an English translation. For future releases, we plan to give you more control of the pairing so that STAR is better tailored towards your personal preferences.

The most handy feature of this pane is that the scroll bars are synchronized, so that if you are desiring to inspect the English version of some result found in the Hebrew, you can navigate on the left side of the pane to chapter: verse reference and inspect the English equivalent to the right. Due to the fact that the Hebrew font shown on the left side of the pane never perfectly matches the row spacing of the English, the text will never perfectly fully align from top to bottom. In order to make a near perfect alignment, slide your

cursor to the verse of interest ensuring that the center of the scroll bar is aligned with the verse. You should notice that the right side of the pane showing the English equivalent is now perfectly aligned at the same verse. The screen snap below shows where this was done for the verse Esther 5:4.



As a reminder, the Hebrew text is read (and laid out in the pane) from *right-to-left*, while the English reads *left-to-right*.

Further details and other goodies provided by the *Documents Pane* are provided in its detailed functional description.

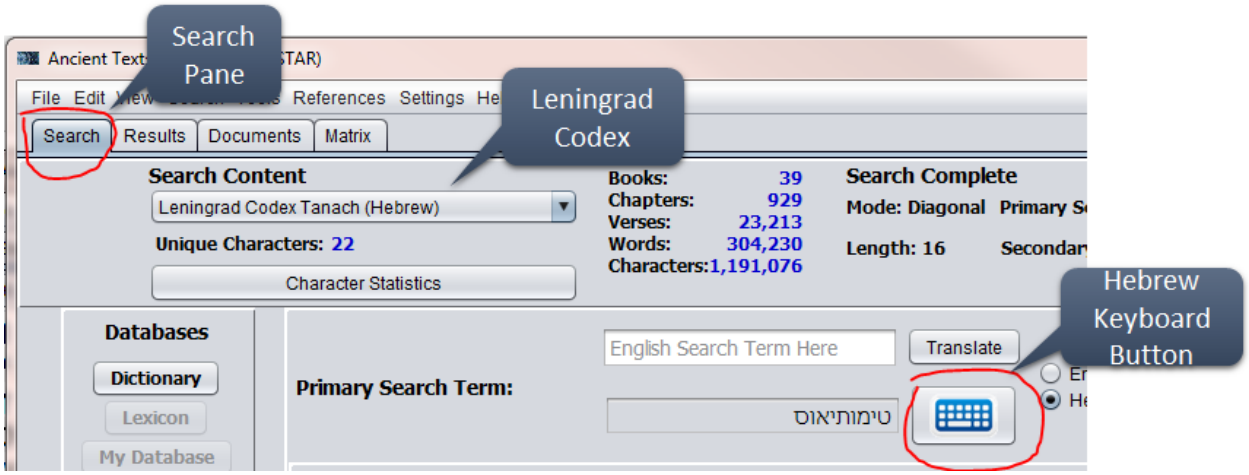
4.5 Exploring the Matrix

Although several high level features regarding the matrix have already been discussed, you should be aware of some other overview features involved with exploring the matrix.

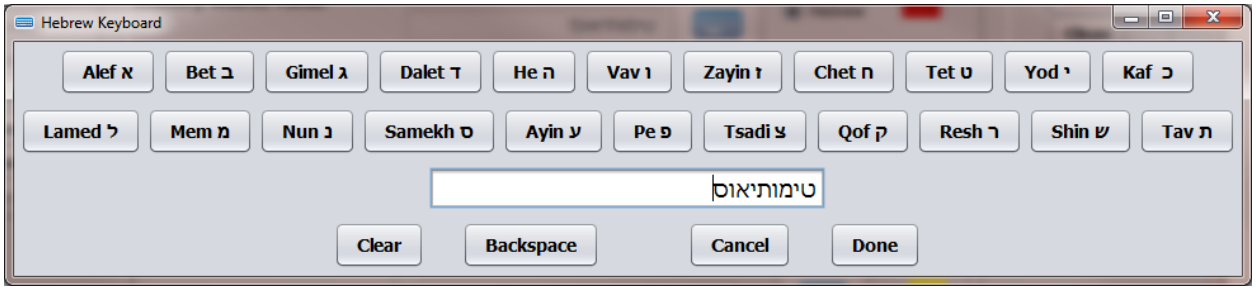
Identical versions of a result matrix are shown in two separate panes of STAR. As previously noted, the matrix can be found in the *Results Pane*, where selections from the *Results Table* change what you see in the *Matrix Table*. The matrix is also displayed independently in its own pane, the *Matrix Pane*. This view may be useful to you if you need more space on your desktop to view large matrices.

The matrix shown above is from the CK Timotheus key. Since we haven't yet used our Hebrew Keyboard, lets go back to doing a primary search for this search term and then perform a search within this matrix.

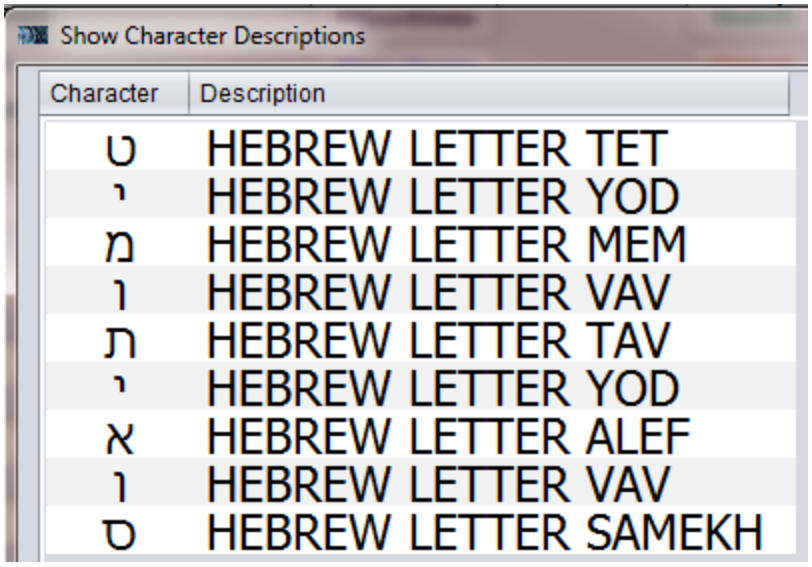
From the *Search Pane* as shown below, select the *Hebrew Keyboard Button*  .
Notice that we have also selected the *Leningrad Codex* as our Search Content source.

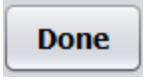


With the keyboard displayed, type in these characters (**טימותיאוס**) as shown.

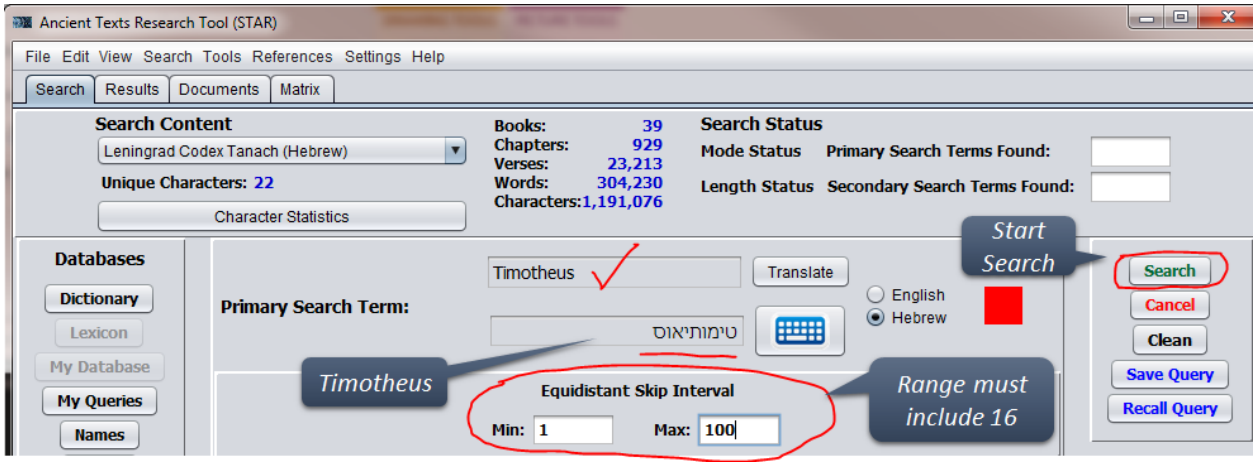


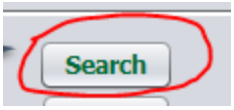
Since these letters can be hard to make out, here is a cheat sheet from one the STAR features that allows you to show character definitions.



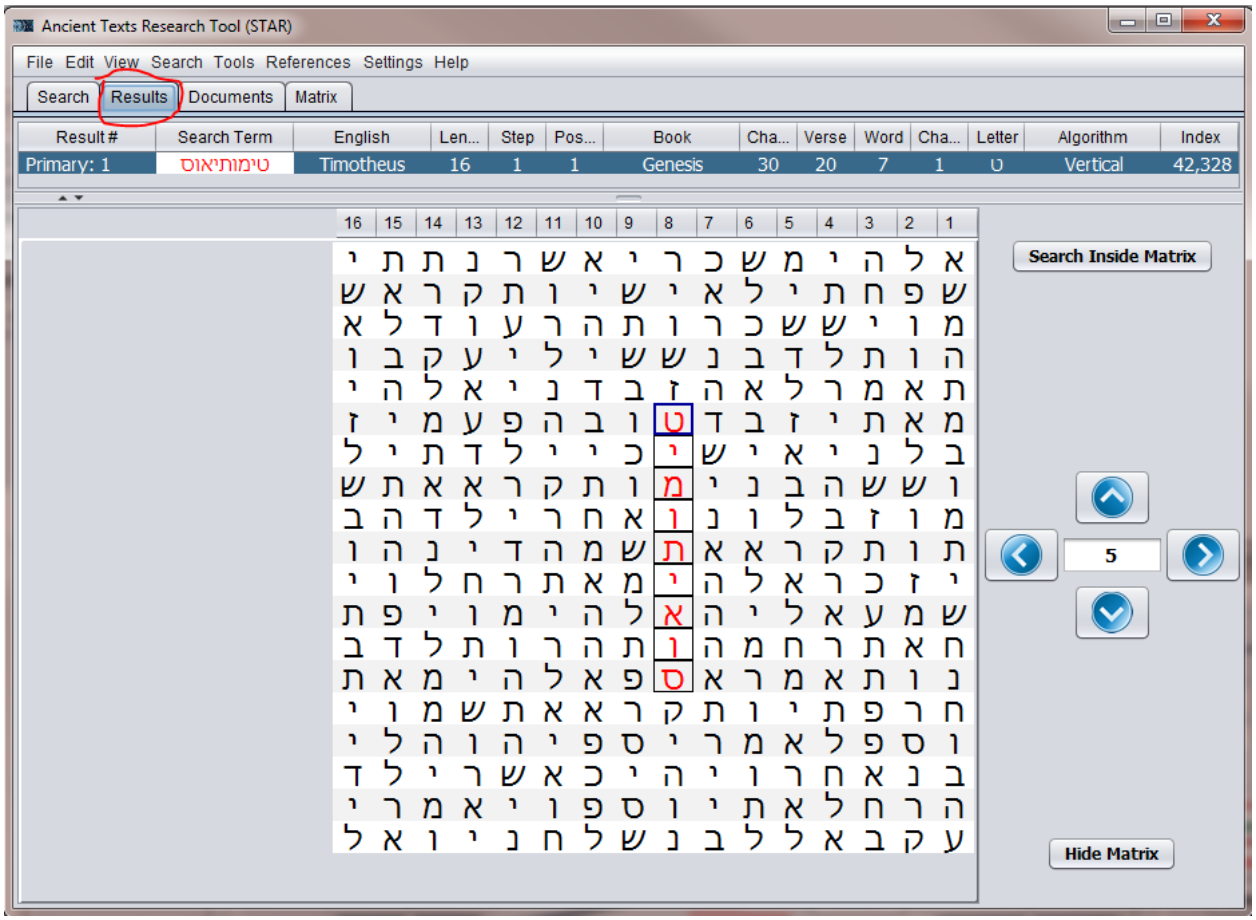
When finished, select the Done button 

to save to the input to the search field and close the keyboard.



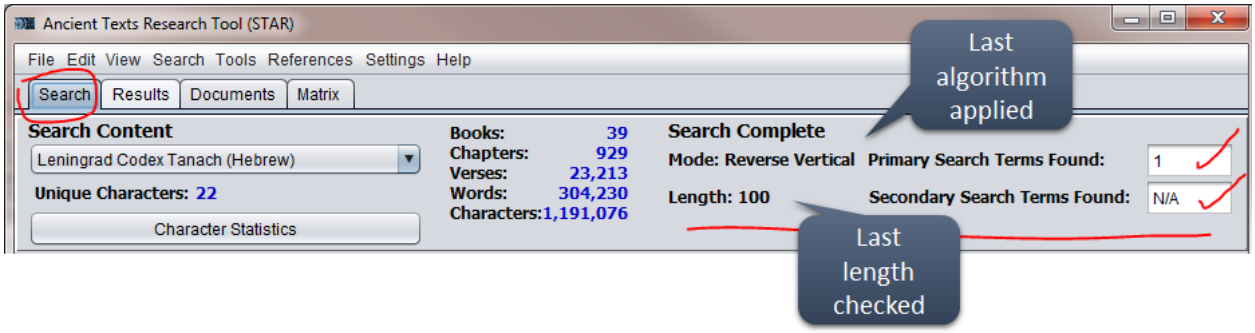
Back on the Search Pane as shown above, inspect that the primary Hebrew search term is present. In addition to the Hebrew, we have typed in the English equivalent so that it will show up in the English column of the Results Table (for clarity of this exercise). You will also need to update the Equidistant Skip Interval to a range where a length 16 matrix will be searched for the terms (since we know that is where the term is present). Once you have updated that, perform the search by selecting the Search Button. 

Assuming you have the auto navigate to results pane set, you will hear a beep and the view will navigate to the *Results Pane*. You should find just one nice neat little result as shown below. If your ***Timotheus*** key result is not lining up at the 8th column as shown in the snap below, return to the *Search Pane*, and change your Search Content data source to the *Leningrad Codex*.

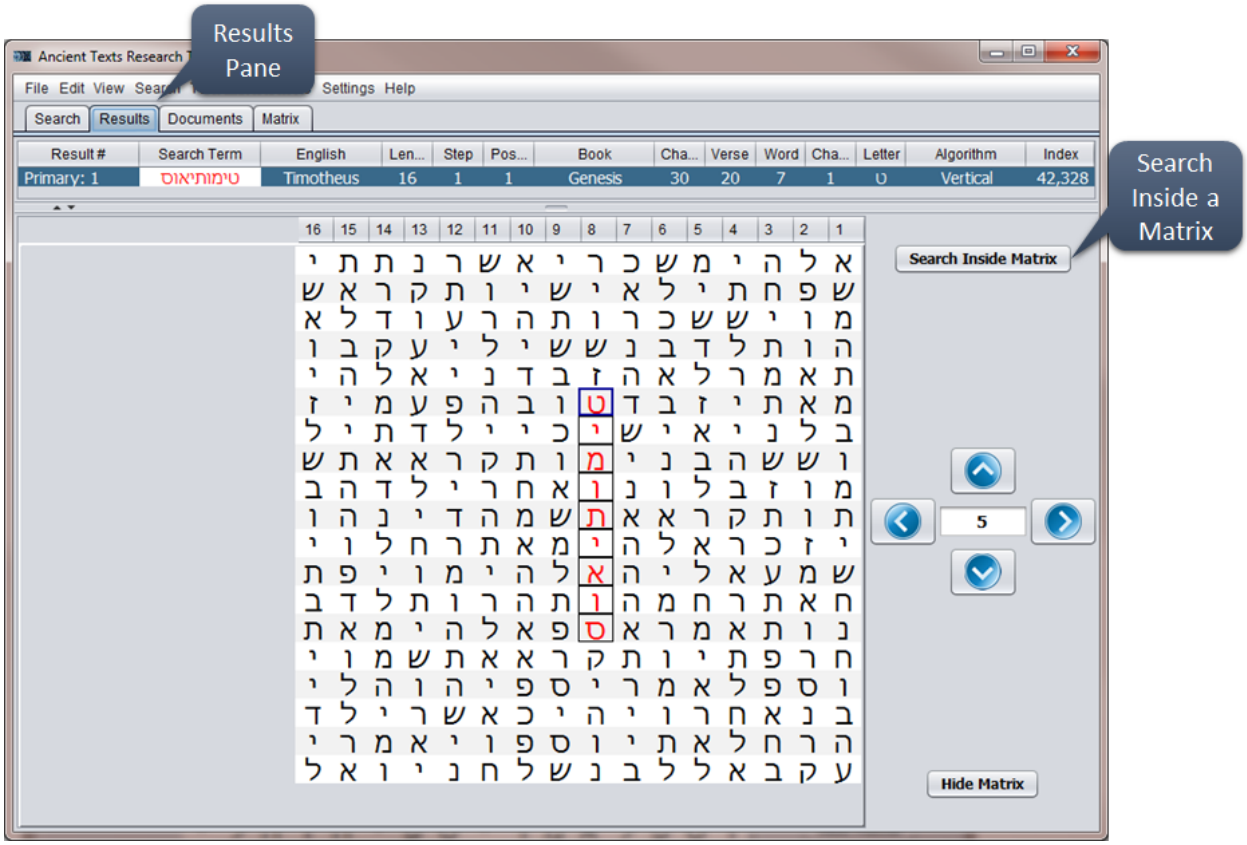


If you navigate back to the *Search Pane* momentarily, you can inspect the status from the search as shown in the snap below. If you had performed a much more intensive search, e.g., EDLS length 1 to 10,000, you would have seen these status elements updating during the progression of the search. The status which remains on the pane is that of it's last iteration of an EDLS length (which was 100) using the Reverse Vertical Search Algorithm. The view also indicates that one (1) result has been found. Clicking the text field that shows the number of results (i.e., 1 for this example) will take you directly back to the *Results Pane*.

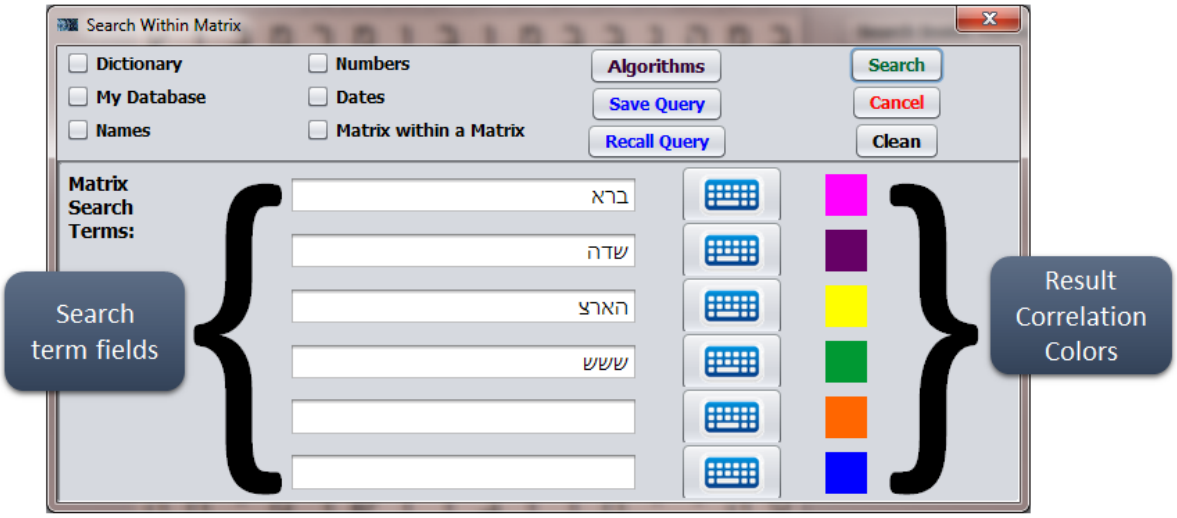
Geek Speak



To perform searches inside the matrix, return to the *Results Pane* as shown in the snap below.

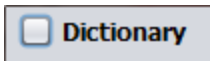


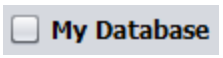
Select the *Search Inside Matrix Button*. You will be presented with the *Search Within Matrix Dialog*. This dialog provides the controls for all the searching you can do for secondary terms (i.e., matrix search terms) that lie within the bounds of the displayed matrix formed by result of a particular EDLS length, where the detected EDLS length forms the column width of the matrix.



Within this dialog, you have the ability to launch searches for terms that you prescribe in the six input text fields, but also terms within the following databases and sequence lists (the options

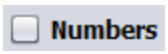
are use checkboxes as shown):

- a dictionary database, Dictionary 

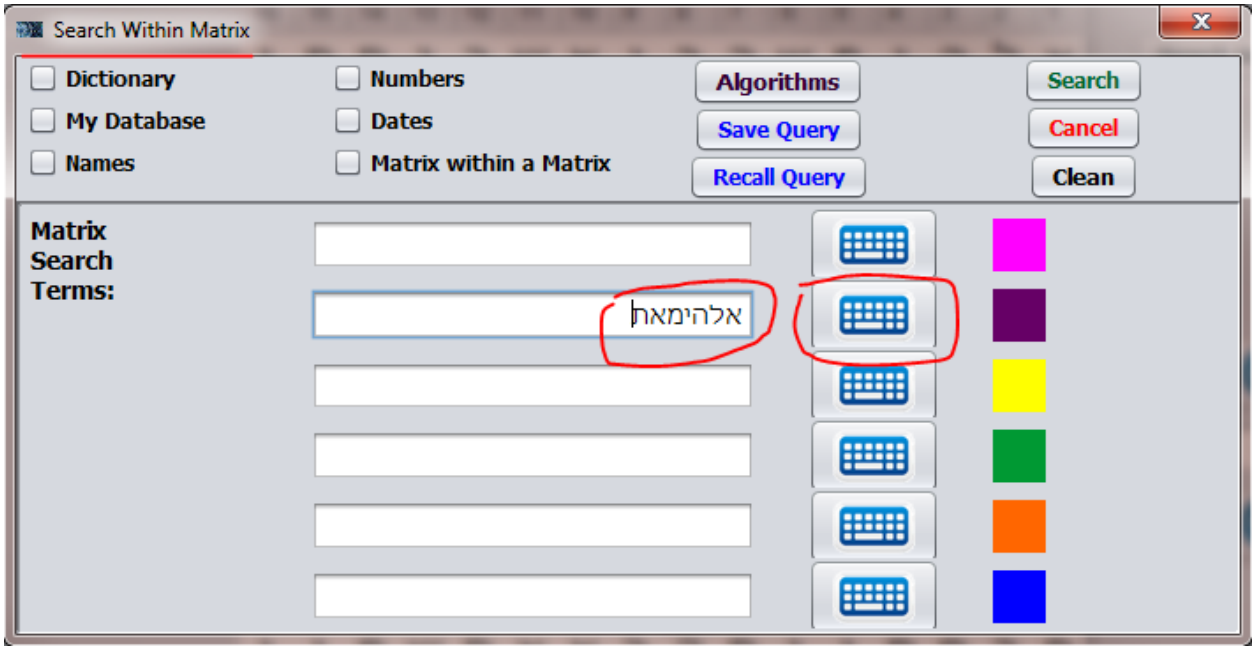
- a unique database of your own defined search terms, “My Database”, 

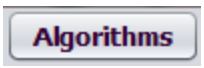
- a names database, Names 

- a range sequence of dates , Dates 

- a numbers database (future release) 

For this Quick Start section, let's run through a simple secondary search using a user supplied matrix search term. This example comes out the CK book where the ***Timotheus*** key is shown crisscrossed with the term אלהימאת (Elohim followed by Alef and Tav). The term is entered into the dialog as shown in the snap below. You can either copy and paste the term from this manual into the dialog, or use the Hebrew Keyboard button  next to input text field.

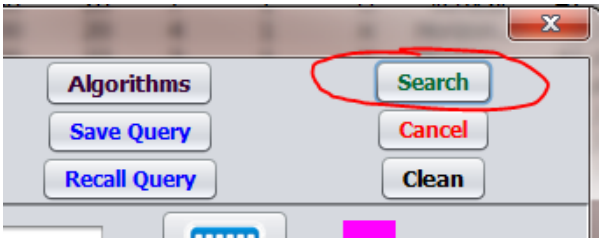


Via the Algorithms button 

, select it to show the search options. You will update the search settings to look as shown in the snap below. Horizontal search checkboxes are selected to enable Search to find incidents of your search term that span across the matrix (the concept of steps is explained later in the manual). The “Limit Search in Matrix to Displayed Rows” is checked to prevent Search from looking for search terms outside the current viewing

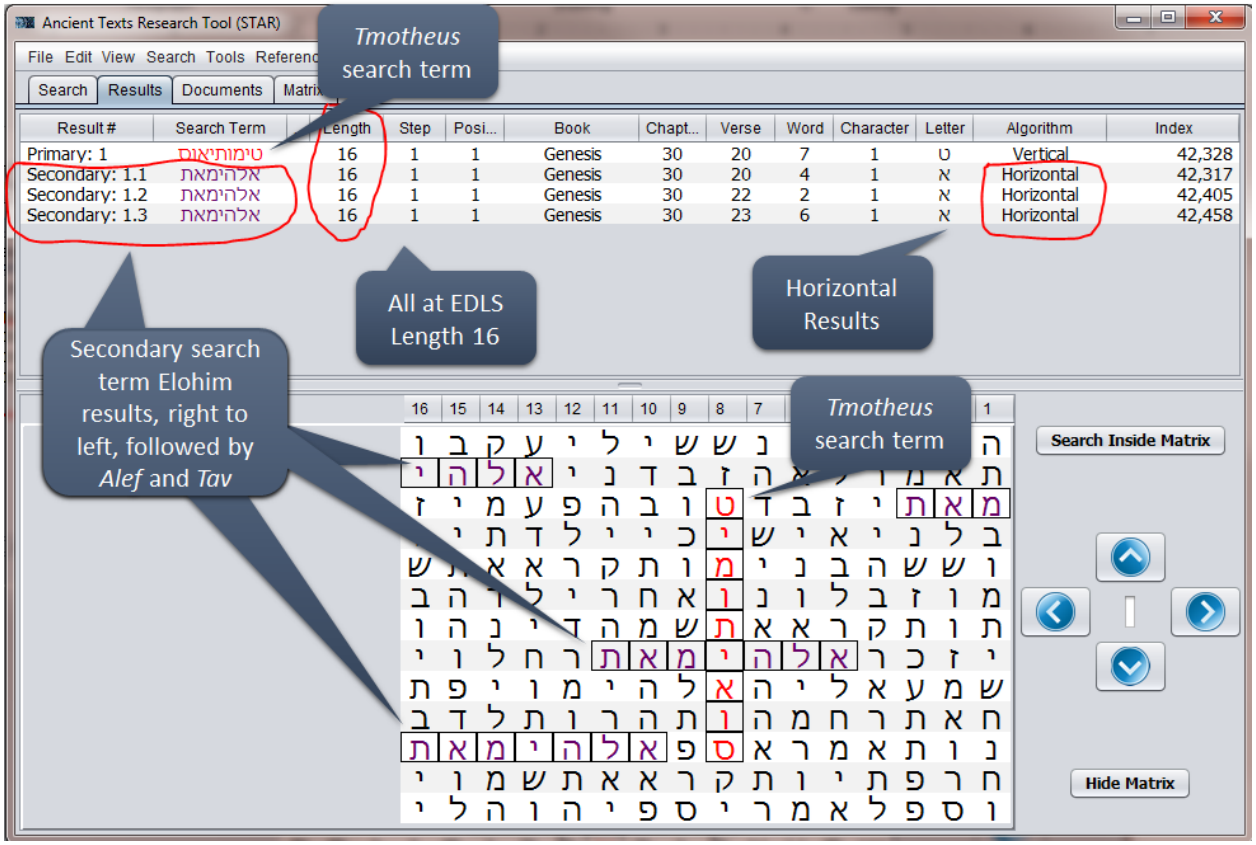
constraints you have established. Selecting the Ok button  will save and hide the *Search Algorithm Settings Dialog*.

With these algorithm settings now in place, select the Search button on the *Search Within Matrix Dialog.*



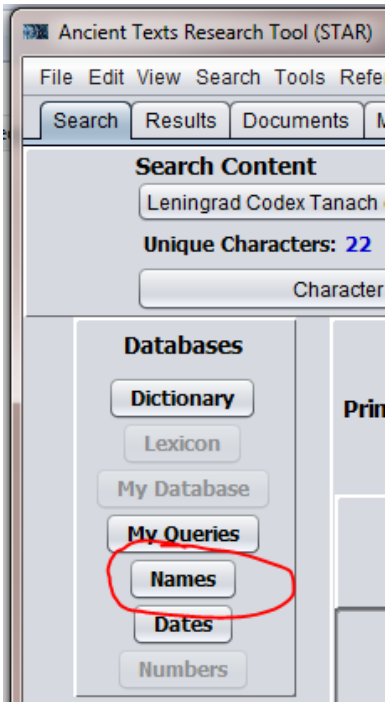
The following snap below shows the new Secondary Results in your Results Table which is color coded to synchronize with the color of the matrix search term. The results for each row also appear in your matrix view in the lower half of the pane.

You will not need to re-enter any search terms after doing this, but you will need to perform Search again from the *Search within a Matrix Dialog*.



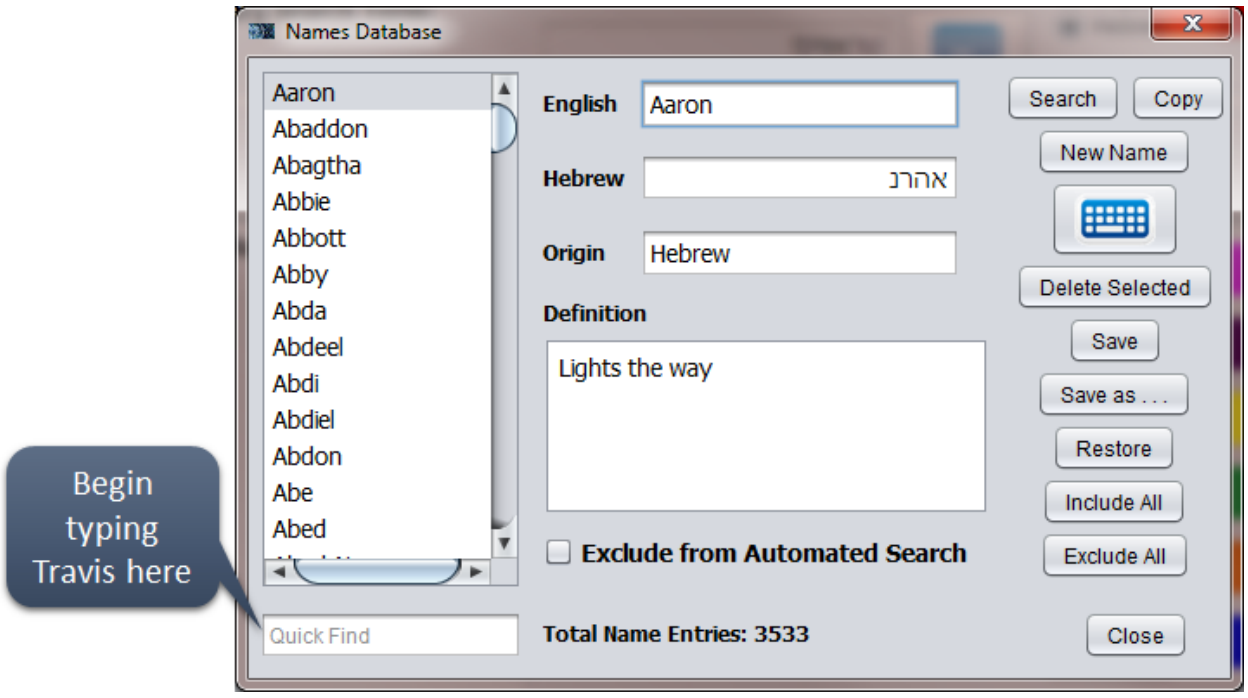
4.6 Potpourri

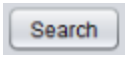
Our Quick Start Potpourri Section takes you through a fun recreational use case of STAR that will quickly familiarize you with some of features of the tool that go beyond some of the decryptor type tools you may be familiar with from the past. The use case, which we endearingly call the "Travis Test", takes you through a quick usage of the STAR Translate, Name, and Statistics functions in order to determine if *Travis*, a great Texan name, might also be another type of Chamberlain Key, similar to the *Timotheus* key.



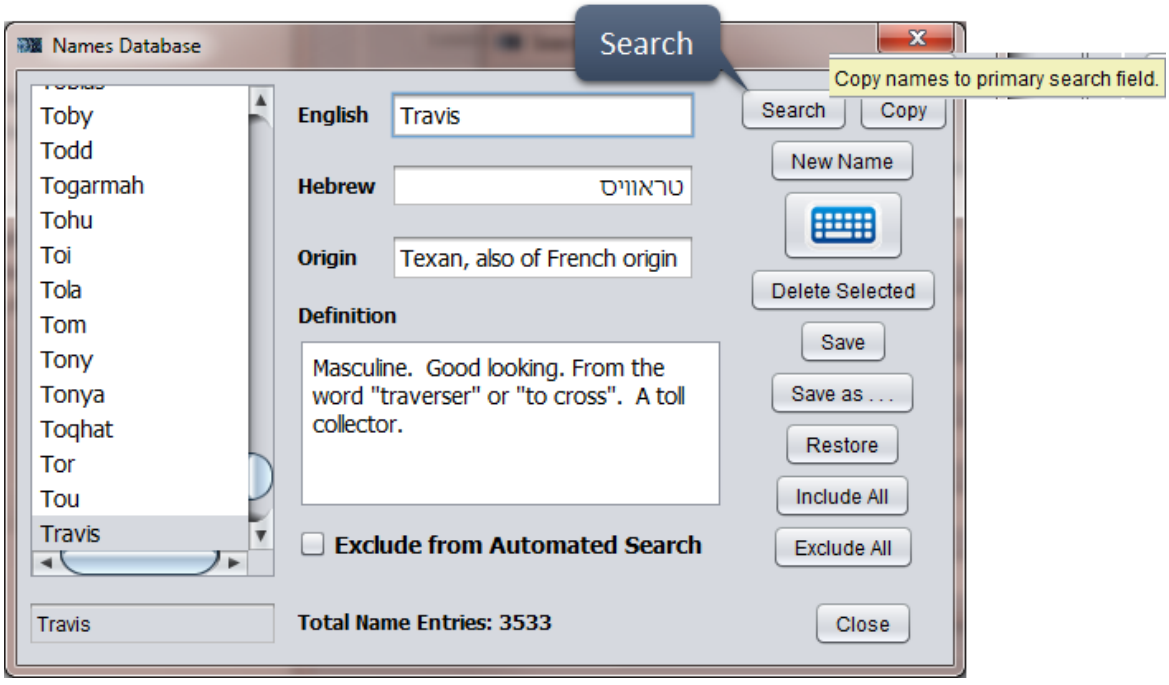
To begin, let's just jump into the Names database and inspect what STAR has to say about *Travis.* The Names Database can be selected right from the *Search Pane* as shown.

Once the dialog appears, type letters of the name *Travis* until the definition shows (or you select it from the list via the scroll bar).

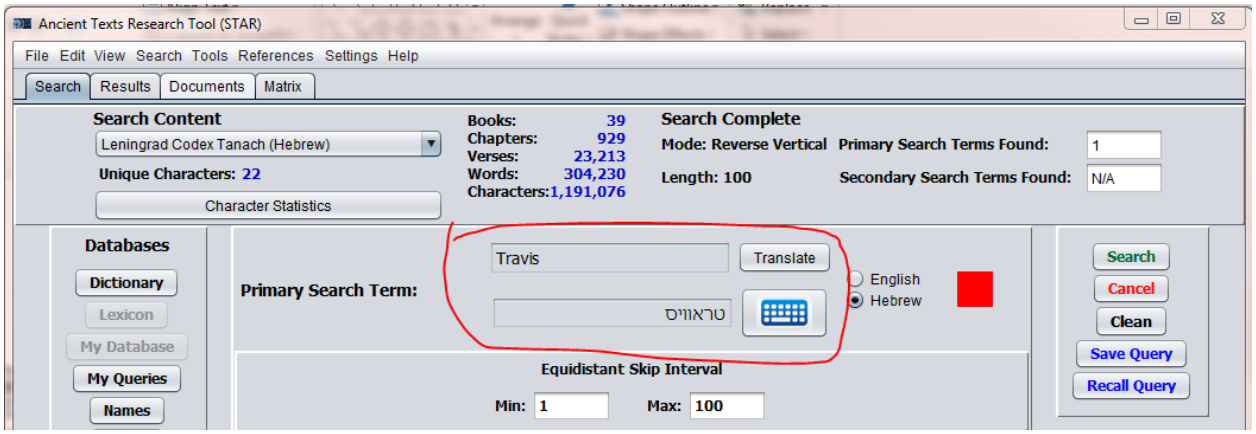


Once found, your *Names Dialog* should look as follows in the snap below with all the details regarding the name *Travis*. This dialog has many functions that are explained in the detailed section of the manual. We won't go into those functions here, for the sake of keeping this thread as concise as possible. For now, just select the *Search Button* 

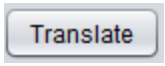
. On this dialog, the search copies the English name and its Hebrew equivalent over to the *Search Pane* (this will be updated in future release to also immediately launch Search).



You should find that *Travis* and its Hebrew equivalent (טראוויס)are copied to the *Search Pane* as shown in the snap below.



Although at this point you are all ready to search for *Travis*, we want to show you a couple of important features of the STAR tool. Instead of going to the Names database to have acquired the Hebrew equivalent of Travis (טראוויס), we could have used the *Translate Button*

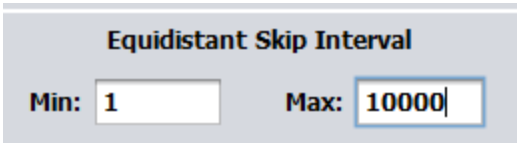


on the *Search Pane*. Before you do that, delete the Hebrew equivalent of the name *Travis*, then select the *Translate Button*. By doing that you will see that Translate fills in the Hebrew equivalent name via a call to Google Translate (you must be connected to the internet for that to work).

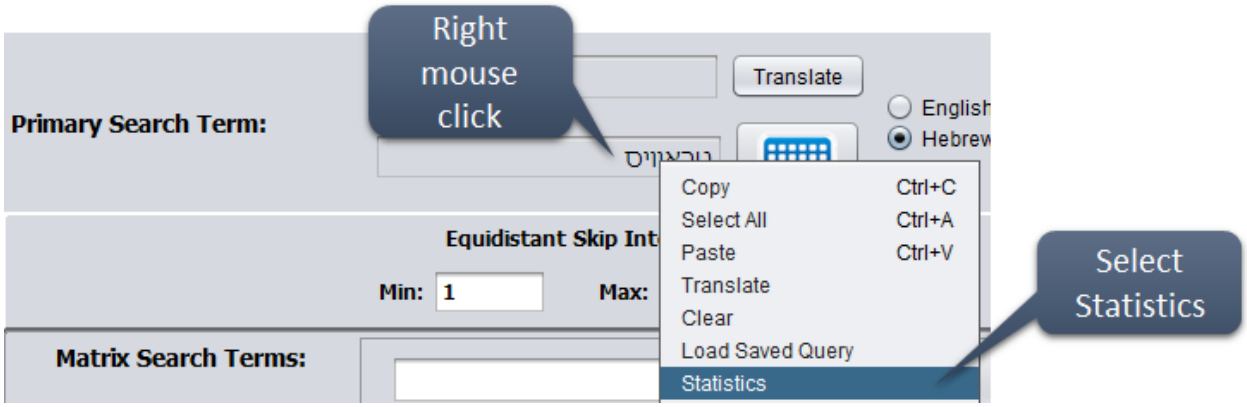
4.6.1 Quick Intro To STAR Statistics

You can go ahead and do a search now if you like, but we really need to show you another feature before you do (we know, it is probably killing you to have to wait on hitting that search button to learn if Travis is the next Chamberlain Key).

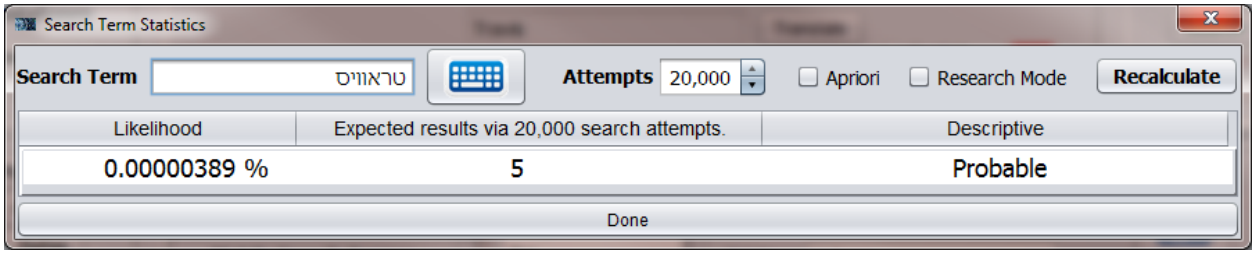
We need you now to set the Equidistant Skip Interval max setting to 10,000. That's right, we want you to do a big long search, cause we think Travis is really special and think he should show up in the Matrix.



Now, before you search, we want to do one last check to set our expectations based on sheer math and probabilities of the likelihood that our good looking *Travis* from Texas is the next CK. As shown in the snap below, right click your primary search field and select the *Statistics* menu-item.



The *Search Statistics Dialog* should appear and look like this:

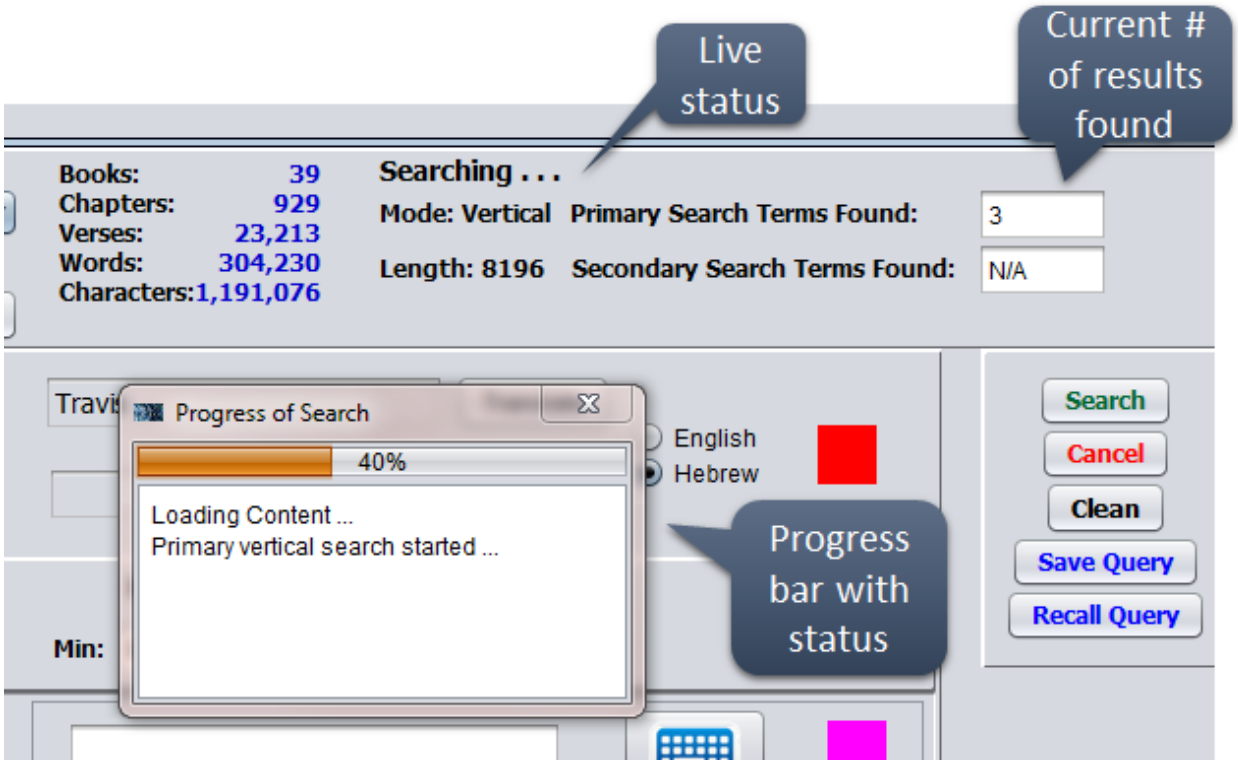


What this is telling us is that it is "probable" that we are going to find *Travis* in this search based on fundamental randomness of the letter sequence that will be searched. Due to the fact that we are doing a search from 1 to 10,000 both forward vertical **AND** reverse vertical, we will be making 20,000 independent attempts at finding Travis. The statistics predict *Travis* will show up five (5) times based on treating the underlying text as a bunch random letters tossed, re-organized, and searched for matches based on ordering of each matrix.

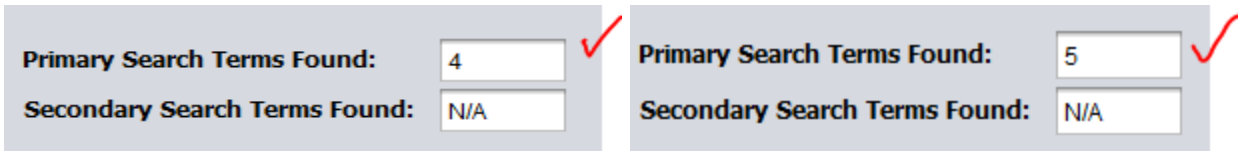
This is just short example of the Statistics function. We will go into all the gory details of the "under the hood" functionality of the Statistics function later in the manual, but from a very rudimentary level, you should get into the habit of checking your searches like this to see if a result is truly phenomenal and synchronistic, or simply a product of a bunch of letters being scrambled.

You can select the Done button on the Search Term Statistics dialog now and return to the *Search Pane*. Now, finally, you can give that big search 

a whirl. This is fun to watch as the Progress Bar appears and status of the search begins flashing along the Search Pane.



If you were performing this search with the *Leningrad Codex* as your Search Content, you will notice that STAR found four (4) results having searched 20,000 times. If you do the search with the *Traditional Tanakh*, you will discover that found exactly five (5) results, precisely what our statistics suggested it would find treating these searches as independent random events.



So for all you good looking Travises out there in Texas, we are very sorry to inform you that you are probably not the next Chamberlain Key, but we hope you had fun exploring some of the new features of STAR.

You have now explored STAR at the highest overview level of the tool and can now deep dive into many of its vast features for conducting your own explorations and research. Good hunting and Godspeed!

5 Primary Search

This section provides a comprehensive description of all the search functions available from the *Search Pane*. If you have jumped ahead to this section before reading the *Quick Start Search*

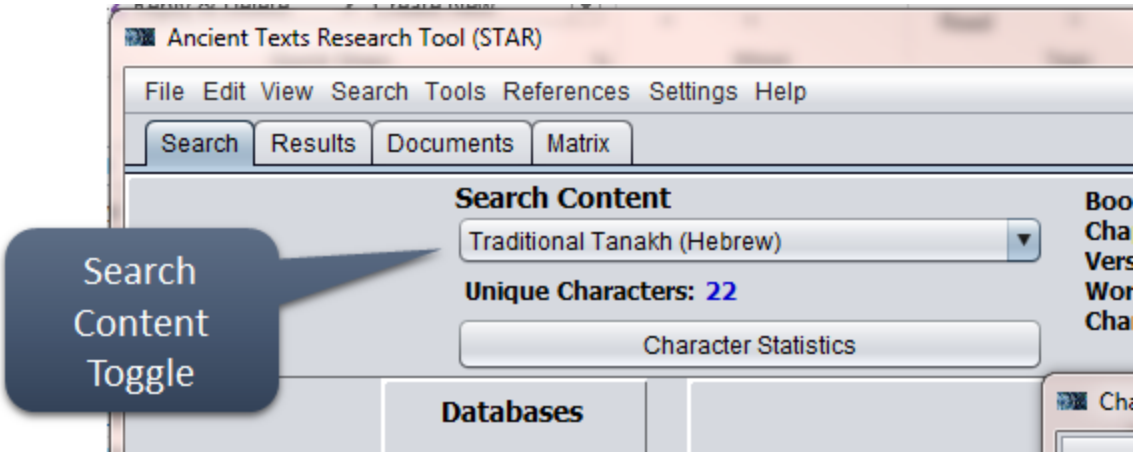
section of the manual, you may want to quickly go back to Quick Start to review the basic components of Search.

5.1 Search Content

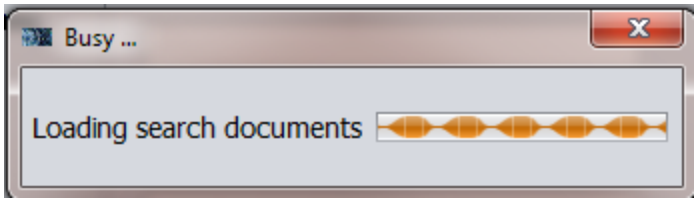
The initial version of STAR has been provided with four different search documents:

- Traditional Tanakh (Hebrew)
- Leningrad Codex (Hebrew)
- Randomized Leningrad Codex (Hebrew)
- New International Version (NIV) (English)

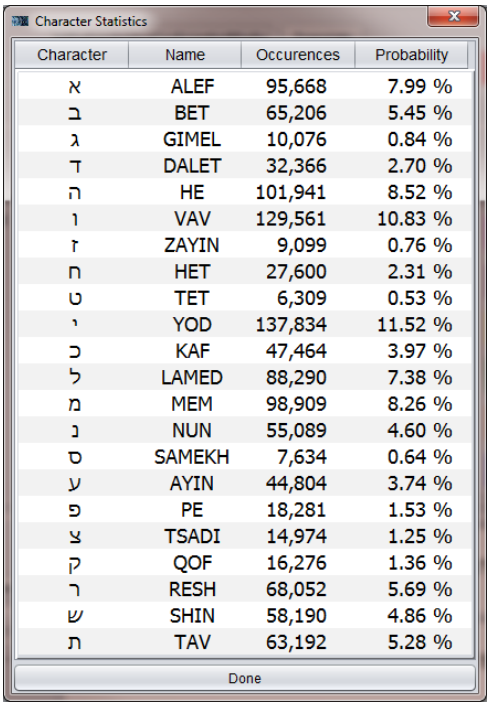
5.1.1 Selecting Text Sources



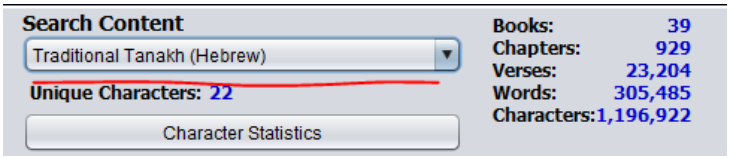
You have the ability to toggle between search references via the Combo Box control on the *Search Pane*. When you switch between documents, you'll see a progress bar while STAR is loading the corresponding reference document and its search array (i.e., letter sequence). This can take about ten seconds based on the speed of your pc/server.



5.1.2 Traditional Tanakh



This Hebrew source document, also known as the *Received Text*, is composed of a Hebrew letter sequence that is found in nearly every synagogue around the world. We have normalized it to its 22 unique consonants. The stats that are calculated within STAR for this document are as shown.

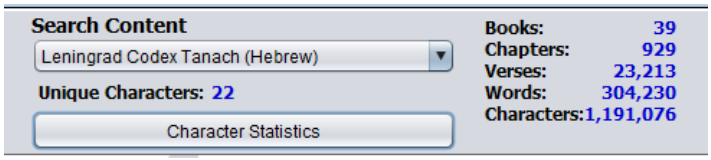


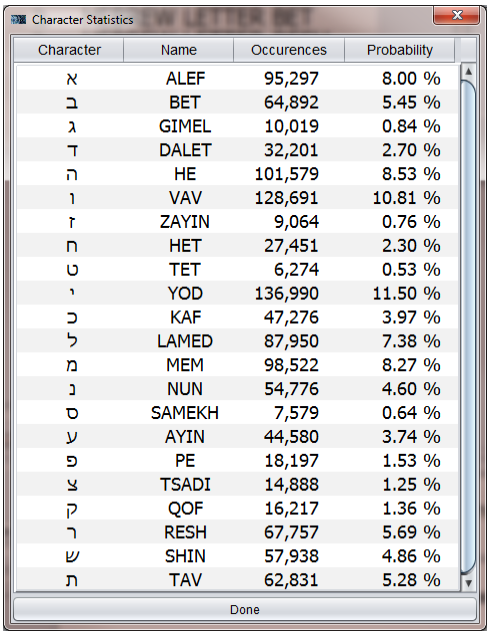
The Hebrew has been paired with an English version equivalent sourced from multiple translations (NIV, KJV, etc.).

The Pro version of our software provides the ability to modify and replace the English equivalents to your liking (e.g., for a particular verse, you may want use the Elizabethan KJV translation over the NIV).

5.1.3 Leningrad Codex

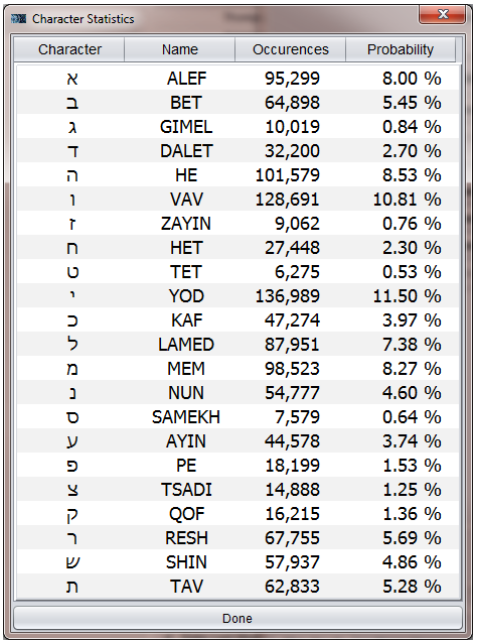
The source text for the *Leningrad Codex* has been imported from the electronic version of the Leningrad Codex maintained by the J. Alan Groves Center for Advanced Biblical Research. It was downloaded from the website: www.Tanach.us . The search array text was normalized to the 22 Hebrew consonants. The statistics for the codex are shown below and to the right.





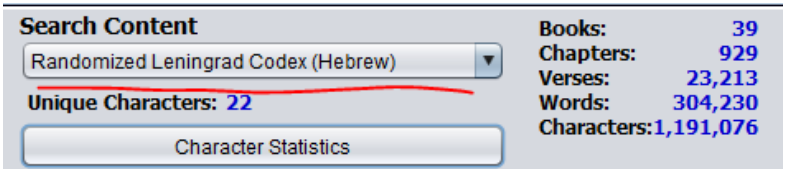
The *Leningrad Codex* has been paired with the NIV for its English counterpart reference.

5.1.4 Randomized Leningrad Codex



The randomized version of the *Leningrad Codex* is provided as a research tool for testing search terms against a search array having the same number of letters as the codes, and a distribution of letter type nearly equivalent, but the ordering of the letters completely randomized. The sequence was generated and provided to us by a member of the community. We have found the sequence so useful, we included it within the factory defaults of the STAR app.

Not that the character count is exactly the same, the individual letter distributions are nearly identical.



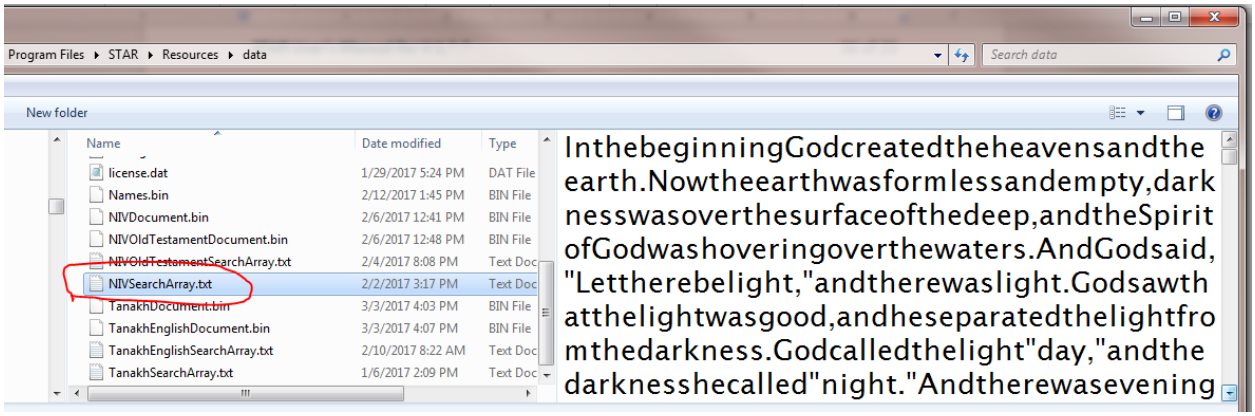
In addition to the on-board Statistics tool, this randomized search array can used to provide you clarity on what really stands out as phenomenal, and what shows up as a search result simply by mere chance based on the probability distribution of the letters. If you produce some far out results using the *Randomized Leningrad Codex*, then you can be assured that those results were simply gleaned by a rolling of the dice.

5.1.5 NIV

The 1983 version of the NIV has been provided to us a handy test case for those needing to do searches in English only. Obviously, the document is not considered ancient like the aforementioned Hebrew manuscripts. The NIV was included as default search document to facilitate new users with STAR the ability to search English and better visualize matrices and letter sequences in their native tongue.

The English translation of the NIV has been paired with itself (but we are open to the concept of a Hebrew pairing if there is strong interest in that).

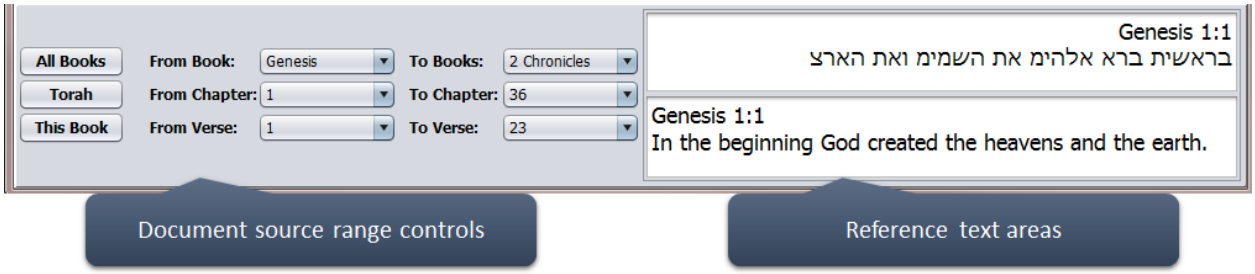
The sequence has been removed of spaces, but unlike the Hebrew letter sequences, the NIV search array sequence has not been cleansed of punctuation marks or even normalized to “All Caps” or all “Lower Case”. You can inspect the on board letter sequence by selecting the text file in Windows Explorer (or whatever tool you prefer) from the STAR installation directory (e.g., `C:\Program Files (x86)\STAR`).



If you want to switch this file out with your own more normalized rendition (possibly in all caps and without any punctuation marks), you can do that. Although you will be able to search, the underlying reference to the actual text may be a little out of whack. If you have a real interest in a normalized version properly indexed to source reference text, please reach back to us, and we can quickly provide you a matching *NIVDocument.bin* file to correspond with your desired search array.

You may also want to consider a license for the Pro/Education version of the software that gives you more control of the underlying documents and the ability to import new documents.

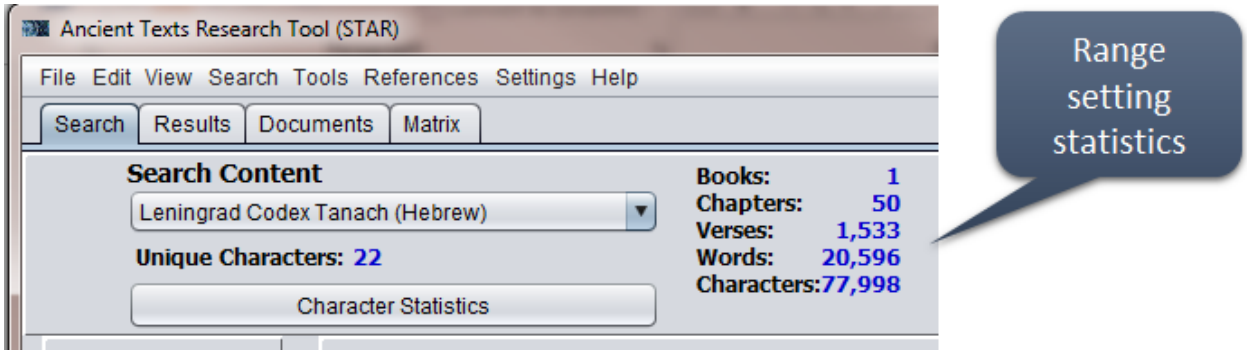
5.2 Document Range Controls



The Document Range setting controls are found at the bottom of the *Search Pane.* The buttons and combobox controls provide you the ability to limit or expand the underlying letter sequence that will be used during search.

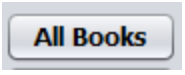
5.2.1 Document Statistics

If you change your document search range setting via any of the range controls, the statistics for the selected range of text is updated at the top of the *Search Pane.* For example, if you select the "This Book" button, you will see the range setting statistics updated at the top of the pane as shown. The snap shows that we will be searching only one (1) book of 50 chapters with a specific character count of 77,998 (which is the book of Genesis).



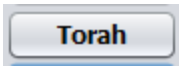
The combobox controls allow you to set the inclusive range of the text to be searched by book, chapter, and verse. The button controls provide quick selection of ranges and are explained as follows.

5.2.2 All Books Button

The 

button is a handy button for returning your document range setting to the entire reference text.

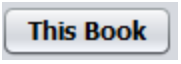
5.2.3 Torah Button

The 

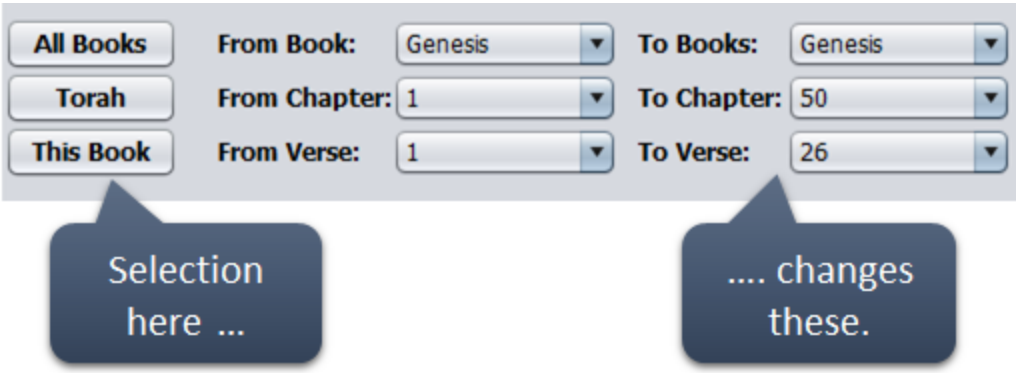
button will set your range to the first five books of the Bible. This button does not apply when searching other documents such as *War and Peace*.

5.2.4 This Book Button

When selected, this will update the range to only the book shown in the *From Book Combobox.*

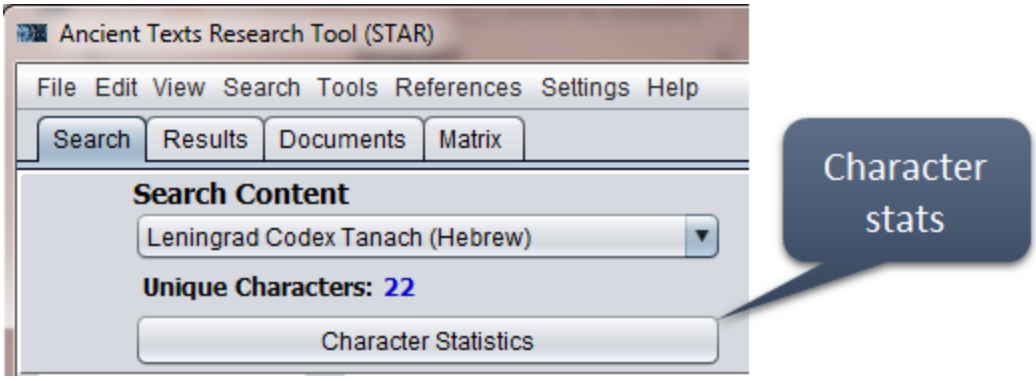
For example, if you select 

with Genesis as your From Book setting, then the "To" range setting will be updated to show the same book, the last chapter of the book, and the last verse of the book. This will ensure that your search encompasses the entire letter sequence of the selected book.



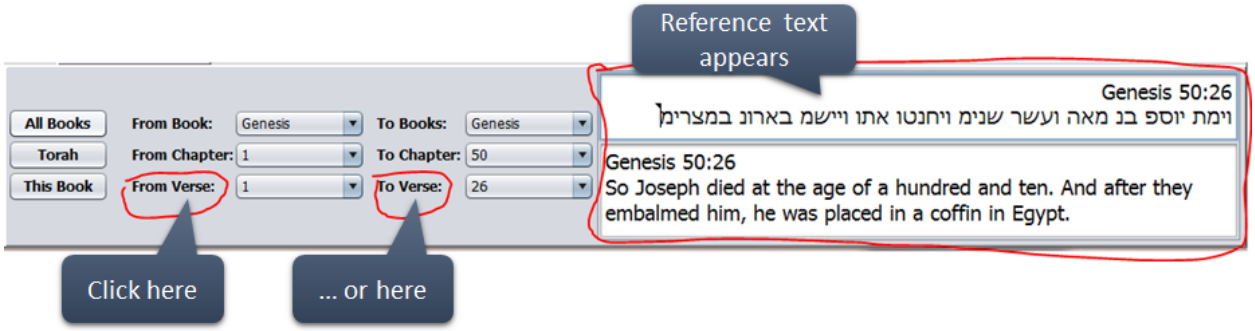
5.2.5 Character Statistics

Character statistics can be generated based on your range settings using ***Character Statistics Button*** found in the top left section of the *Search Pane*.



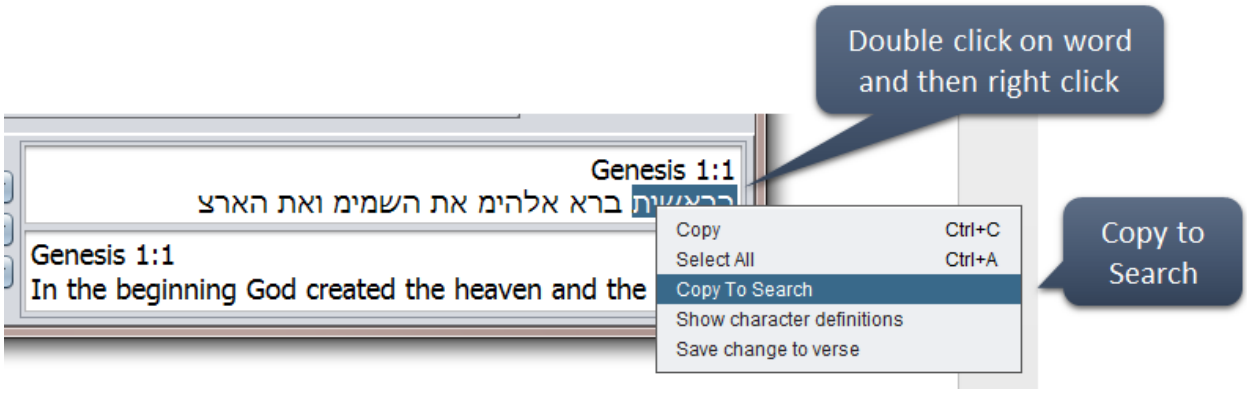
5.2.6 Reference Text Area

As explained in the Quick Start section of the manual, if you select either the "To Verse" or the "From Verse" labels, the respective reference text will be displayed in the Reference Text Area boxes. The Hebrew will be oriented right-to-left, while English et. al. languages will be shown left-to-right. In the snap below, we have selected the "To Verse" label, which results in Genesis 50:26 being shown since that is the verse selected by the From comboboxes.



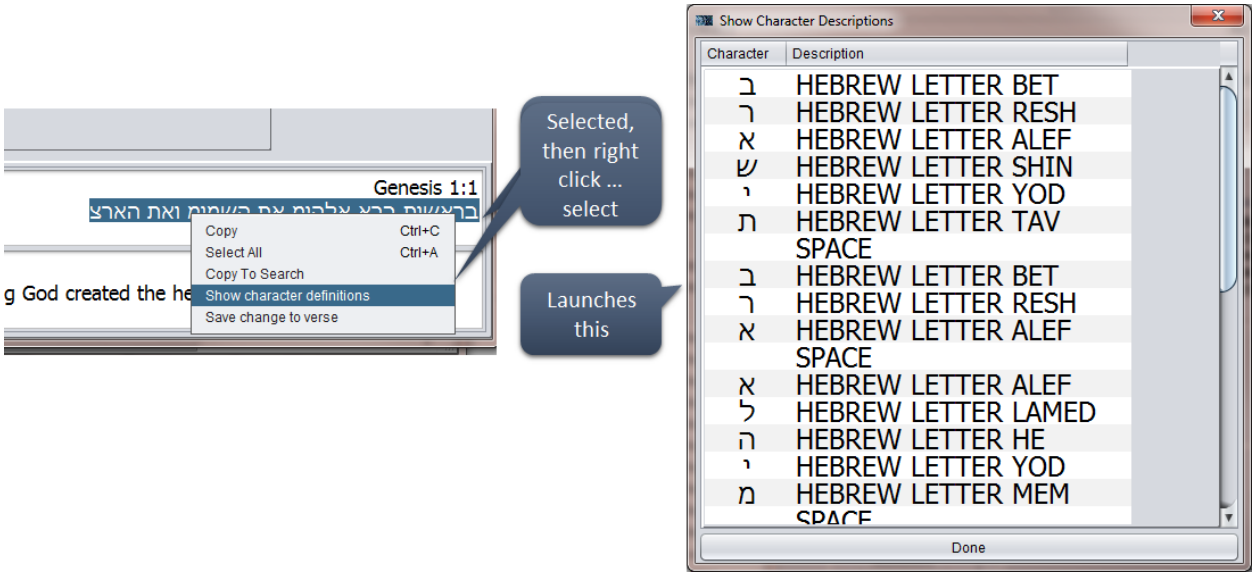
Within these text areas, you can select a letter, a word, or the entire verse by either selecting and dragging or in how you click your mouse. A single click of mouse with your cursor on a word will select the word. A double click will select the entire verse.

A right click will provide several options of actions you can take on your selected text.



Show Character Definitions

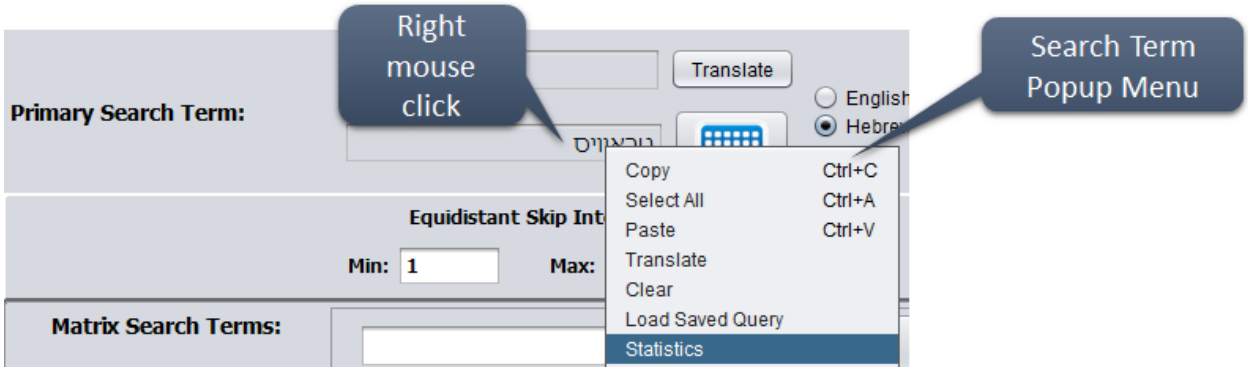
An extremely handy feature of STAR is the "Show Character Definitions" dialog that is launched when you select some text and right click to select the option. This dialog can also be launched from many of the other input text fields within STAR and provides an efficient means to debug search discrepancies when you attempt to replicate results found online and in books like CK.



Save change to verse

This tool allows you to change the underlying verse. With the Basic license, the changes cannot be saved between sessions, and the underlying letter sequence is not affected, but for the Pro/Education version, this is how you can update versions of documents. A separate control panel is provided for you to save new documents and generate custom search arrays. The Pro features also provide tools for importing other documents that you are then able to add to your data sets.

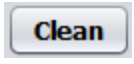
5.3 Primary Search Terms



Both the English and the Hebrew primary search term fields are equipped with a popup menu that is launched by right clicking in the text field as shown above. The Copy, Select All, and Paste functions are each equipped with standard key combination accelerators for you to achieve these functions without having to use a mouse. If performing a copy, be sure to have selected the text you want to copy. The Select All function can do that for you, or simply double click on the word in the text field.

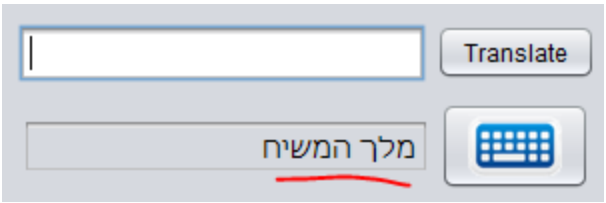
The ***Clear*** function simply clears your text from the text field. The ***Translate*** menu-item when selected will copy your search term and launch the *Translate Dialog* utility. The ***Statistics*** menu-item will perform a probability analysis of your search terms and launch the *Statistics Dialog* with the results. Details regarding the Statistics capability of STAR is further explained here.

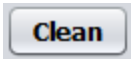
5.3.1 Copying and Pasting from External Sources

STAR enables the ability for you to copy search terms from other sources outside of the App (e.g., text from emails, from browser searches, webpages, etc.). You must be cognizant of the fact that when you do this, you are likely copying Hebrew text that has diacritical markings, vowels, spaces (e.g, white space), etc.. If you attempt to search (without doing a Clean 

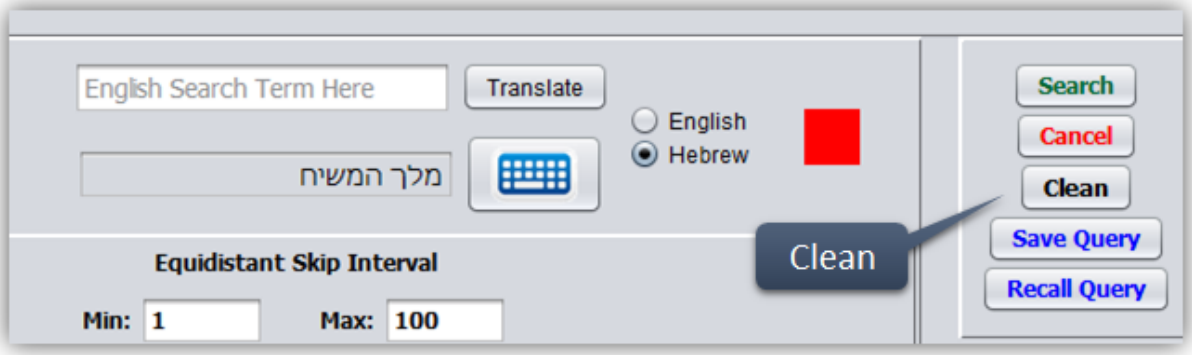
), it will not find any results because your characters have not been normalized to the 22 unique consonants in the source letter sequence.

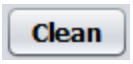
Here is an example where we have copied the Hebrew equivalent of “King Messiah” from a Wikipedia page. When initially pasted into the primary Hebrew search term field, it looks like the snap to the right. If you search on that term with the white space, you will never find a result because the search array has no white spaces. You must perform

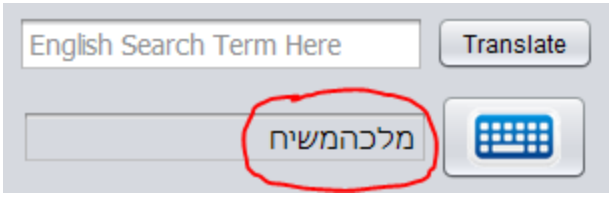


a Clean  as explained in the following section.

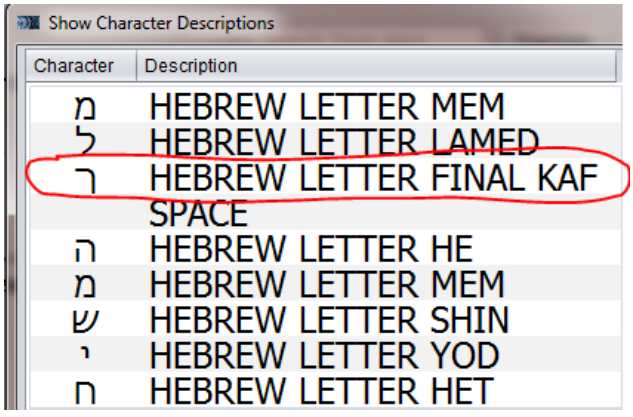
5.3.2 Clean

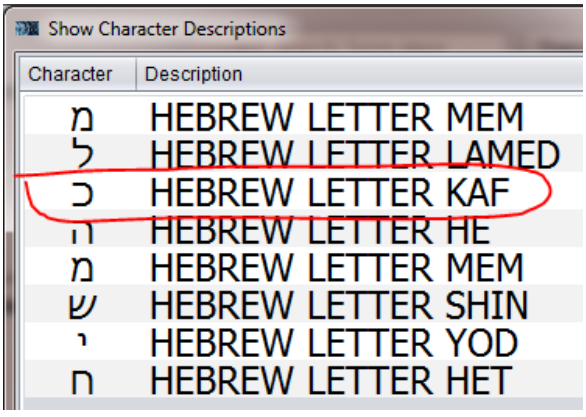


To Clean a search term, simply select the Clean button  as shown on the *Search Pane* above. Clean does two things. First, it removes all whitespace (e.g., spaces) from your search term. Second, it will replace all your Hebrew characters with their consonant equivalents. In our example here, you can see that the space has been removed, but what is not as clear is that the Hebrew characters were normalized.

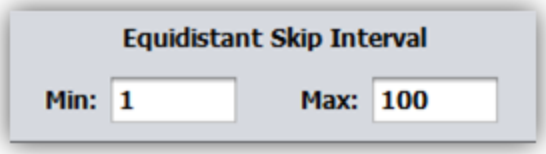


By using the handy dandy STAR *Show Character Descriptions Dialog*, we can see that the text copied from the Wikipedia website contained these exact Unicode characters as shown to the left. The conversion after **Clean** is shown to the right. As can be seen from the snaps, **Clean** converted the Final Kaf to a Kaf, since that is how the reference search documents have been normalized in their search arrays.





5.4 EDLS Skip Settings



The Equidistant Skip Interval settings found on the *Search Pane* prescribe the range of letter skips that you want the Search engine to conduct the searches against. One way to visualize the algorithm is to assemble a matrix of X columns in length at each of your X range increments. As shown above, Search would begin by searching for search terms at the initial skip distance of one (1). The ensuing matrix would be of one column and having the number of rows equal to the number of characters in your referenced search array (e.g., 1,196,922 rows for each of the 1,196,922 characters of Traditional Tanakh letter sequence array). This first iteration of search would then be looking for matches of your search term as it appears in the overt text (excluding the white spaces). On the next iteration of the algorithm, it will look for term matches at a distance of two (2). In this case, you can visualize a matrix of two columns filled in by the letter sequence fitted into 598,461 rows. The algorithm then progresses until the maximum EDLS skip matrix has been formed and checked for instances of your search term.

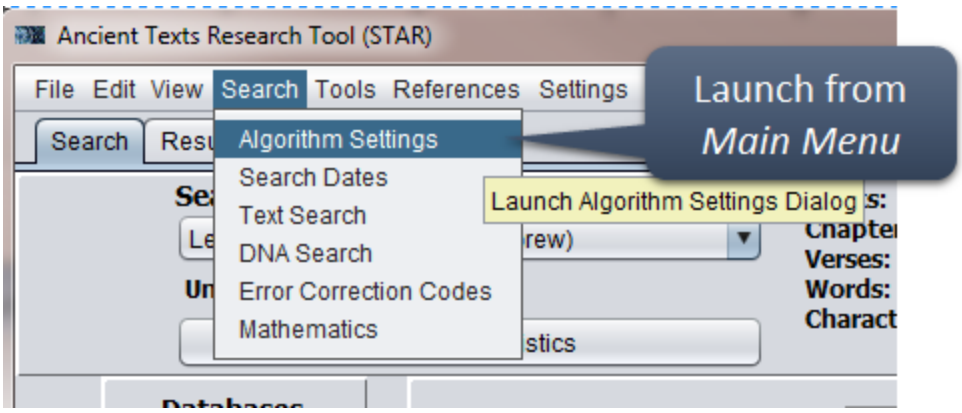
Although the algorithm can be visualized using matrices, that is not what STAR does under the hood. It simply looks at each skip interval and does what you or I might do by testing matches based on the skip setting. For example, at a skip setting of two (2), and a search term "CAT", the algorithm walks down the letter sequence looking for each occurrence of the letter 'C'. If it finds a 'C', it checks whether the letter 'A' exists two letters down from the 'C'. If so, then it checks for the existence of the letter 'T' two letters beyond where it found the 'A'. If all those letters were found in order, it records a result, and continues to search the letter sequence array for additional matches of the term "CAT". It continues this process until each skip distance in your EDLS range settings have been checked.

The duration of your searches is directly proportional to the size of your EDLS range and depends heavily on the processing power of your host machine. Performing a search from 1 to 10,000 can take about a minute on average desktop PC.

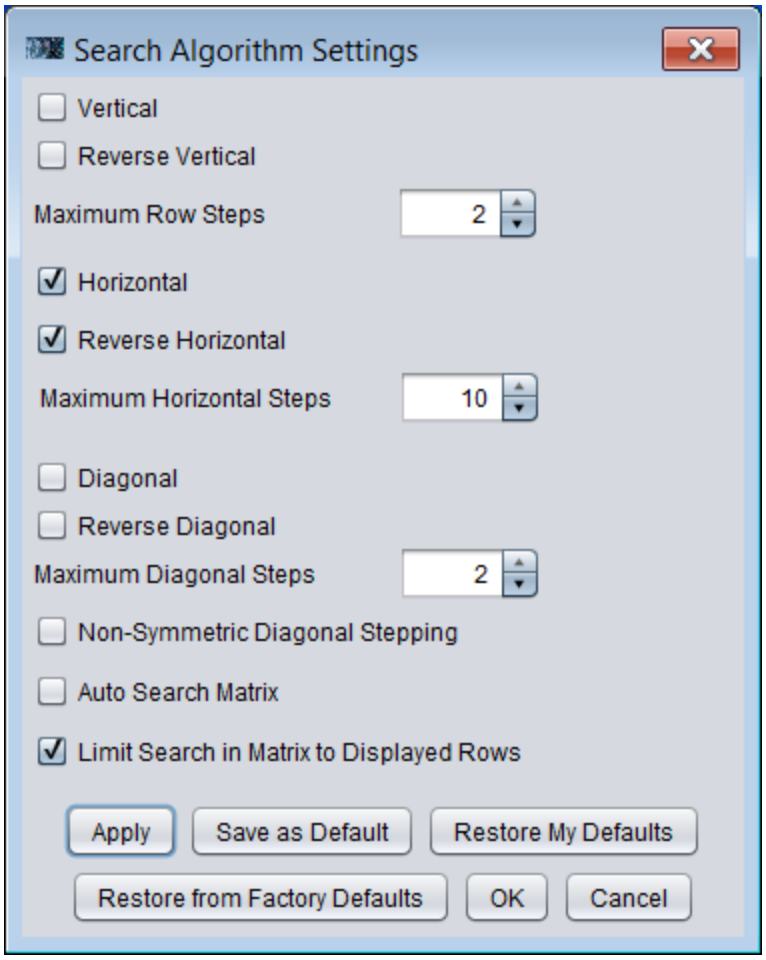
5.5 Search Algorithms

The *Search Algorithm Dialog* may be launched via several different techniques within STAR. The dialog allows you to tailor the options that search will take in both the primary search function and the "search within a matrix" function. The applicability of these settings is explained in the subsections that follow.

Whether you are conducting a primary search from the Search Pane or searching within a matrix, you can always access the *Algorithm Settings Dialog* via the Main Menu as shown below.

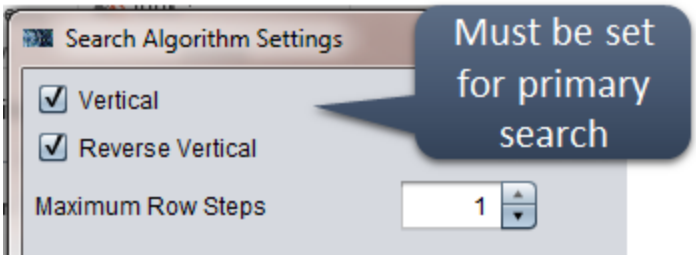


The dialog will initially launch with its factory default settings as shown here:



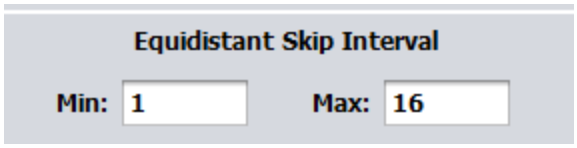
5.5.1 Vertical

For Primary Search (i.e., search for primary search terms), at least one of the vertical options must be selected to return any results from search.



Forward Vertical

The *Vertical Checkbox* indicates that you want to employ the standard forward vertical search of your search terms in the search array. We've dropped the term "forward" from the title of the checkbox since it is implied. The search algorithm will look for instances of your search term at skips designated by the EDLS range settings. For example, if your EDLS settings are between 1 and 16 as shown, the search algorithm will search for the search term at matrices of one column, then two columns, then three, etc., all the way to a matrix of column length 16. An EDLS skip interval of one (1) is single column matrix, which represents the overt text in its original letter sequence. If your search term is a word from the overt text, you can be assured that it will show up as a result at skip distance one (1).

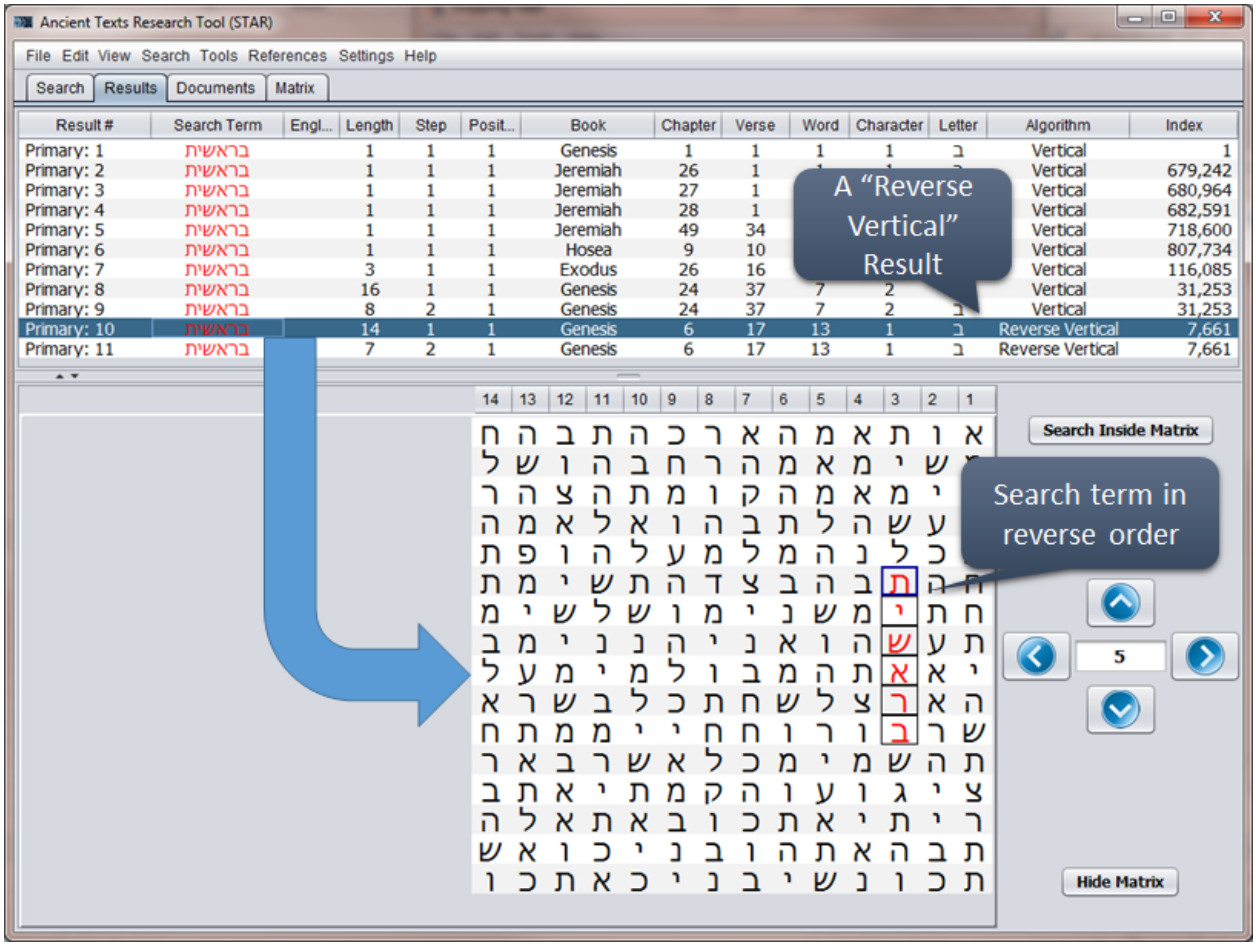


At a skip distance of two, the algorithms performs a search of your term by skipping every other letter of the search array, looking for matches. You can visualize it by assembling a two column matrix as presented by STAR in the matrix views, but under the hood, the search algorithm is simply looking for matches based on the skips.

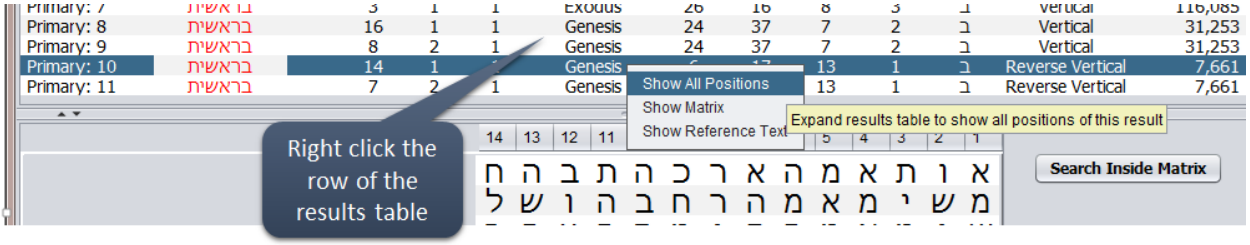
Reverse Vertical

By setting the *Reverse Vertical Checkbox*, you are directing the search engine to look for instances of the search term in reverse order. You can think of this as turning your search term around and doing a forward vertical search, or doing a search of your term starting from the end of the search array and going backwards.

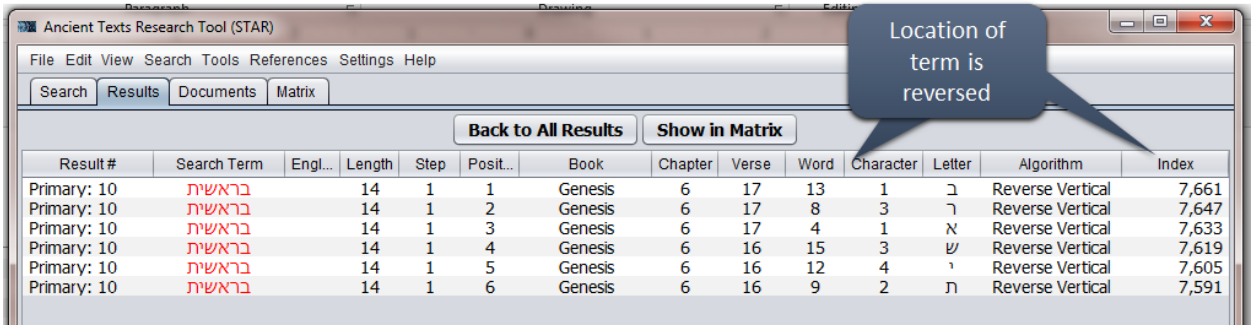
The following snap shows a Reverse Vertical result using the first word of Genesis (i.e., בראשית) as search term. STAR has found the search term at an EDLS skip distance of 14. By inspection of the matrix you can see that the search term is present in reverse order.



To further inspect this reverse vertical result, right click on the result from the results table and "Show All Positions" as shown.



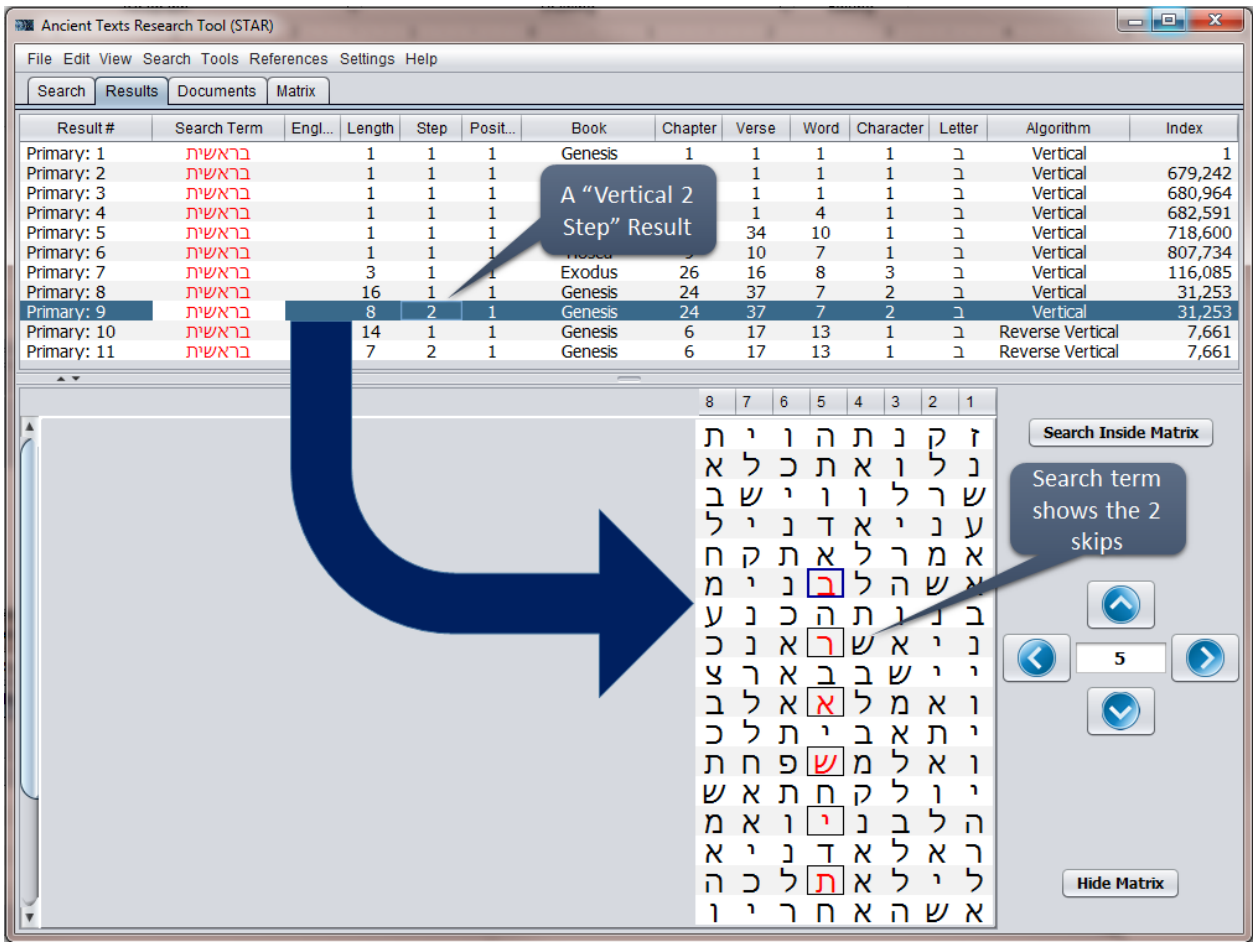
The *Results Table* will now reflect only the positions of each letter of your search term. Inspection of the document reference for each letter of the term shows that reverse ordering. The first letter, 'ב' (Bet) is found at index 7,661, exactly 14 characters after the 2nd letter, the 'ר' (Resh), at 7,647.



Maximum Row Steps

The *Maximum Row Steps Spinner* component enables you to designate skips within your search term. By default, a basic vertical search is always conducted at a vertical row step of one (1). That setting defines the basic vertical search at any EDLS length. In reality, a "row step", is just a derived form of a basic vertical result without any designated steps. This will make more sense via the following example where we have searched for the first word of Genesis.

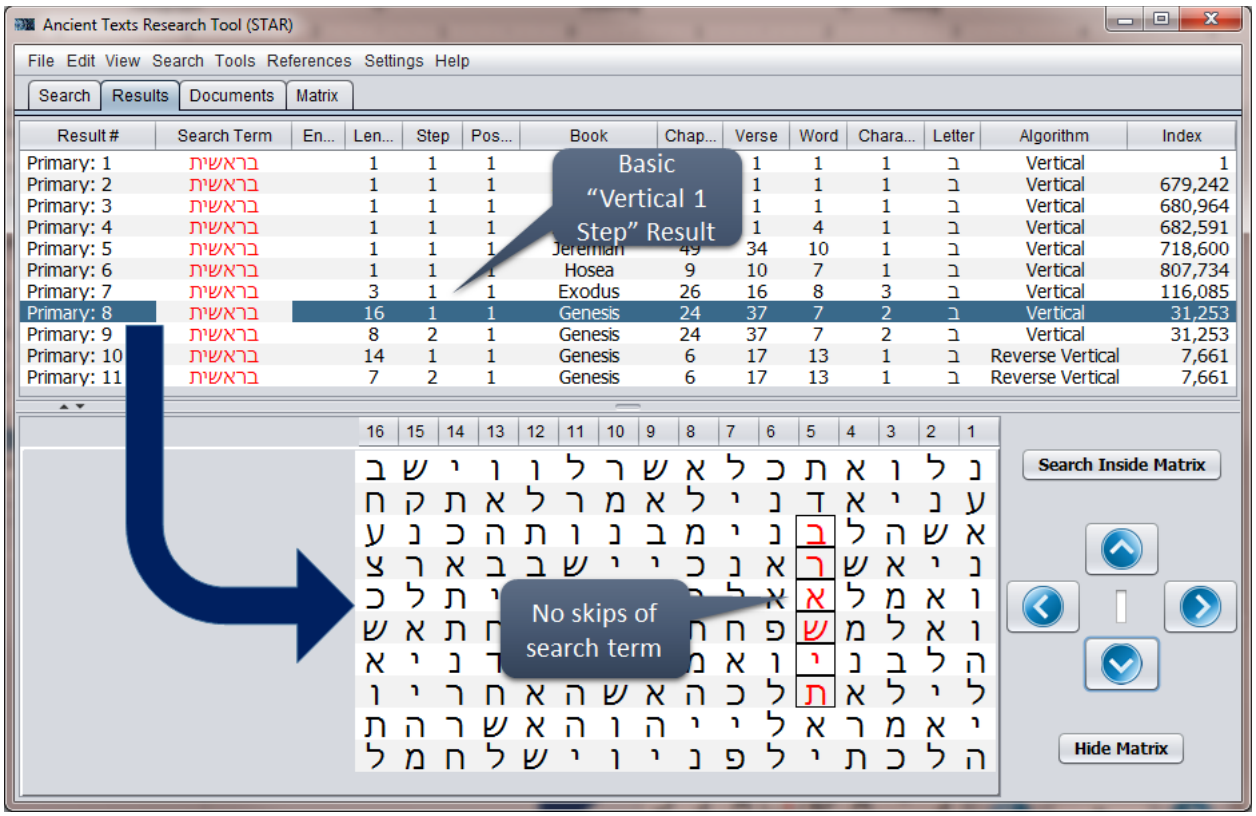
In the snap below you will see a Vertical result shown at length 8 found at a "row step" of two (2). Notice how the view in the matrix shows what appears to be a two step skip of the search term.



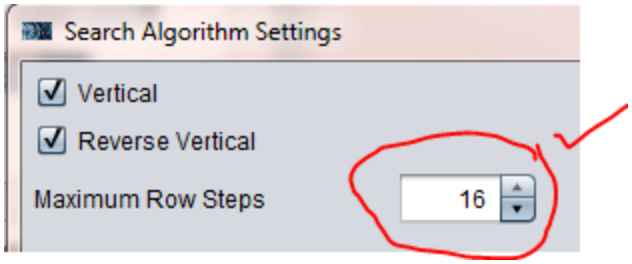
Result #	Search Term	Engl...	Length	Step	Posit...	Book	Chapter	Verse	Word	Character	Letter	Algorithm	Index
Primary: 1	בראשית		1	1	1	Genesis	1	1	1	1	ב	Vertical	1
Primary: 2	בראשית		1	1	1			1	1	1	ב	Vertical	679,242
Primary: 3	בראשית		1	1	1			1	1	1	ב	Vertical	680,964
Primary: 4	בראשית		1	1	1			1	4	1	ב	Vertical	682,591
Primary: 5	בראשית		1	1	1			34	10	1	ב	Vertical	718,600
Primary: 6	בראשית		1	1	1			10	7	1	ב	Vertical	807,734
Primary: 7	בראשית		3	1	1	Exodus	26	16	8	3	ב	Vertical	116,085
Primary: 8	בראשית		16	1	1	Genesis	24	37	7	2	ב	Vertical	31,253
Primary: 9	בראשית		8	2	1	Genesis	24	37	7	2	ב	Vertical	31,253
Primary: 10	בראשית		14	1	1	Genesis	6	17	13	1	ב	Reverse Vertical	7,661
Primary: 11	בראשית		7	2	1	Genesis	6	17	13	1	ב	Reverse Vertical	7,661

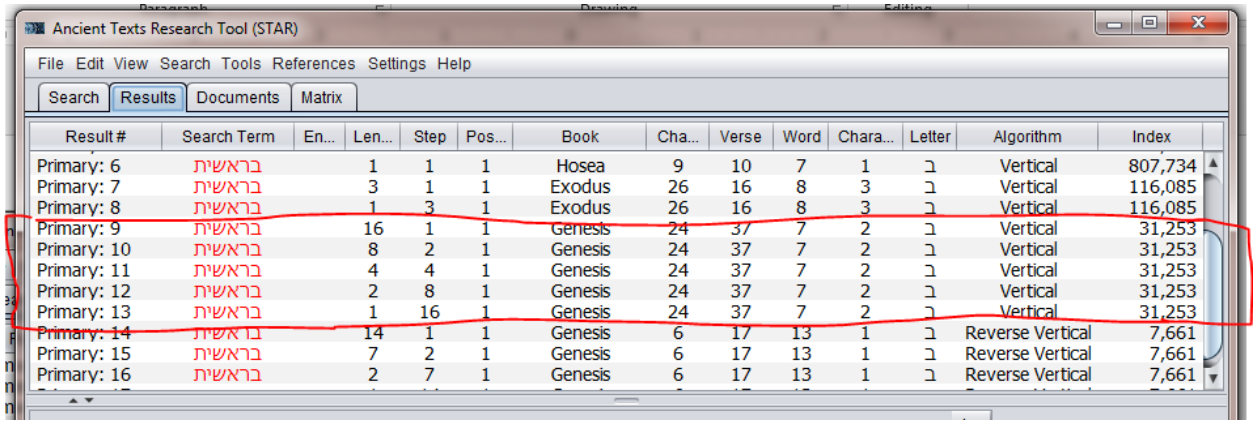
This result is nothing more than the primary result shown in the results table one row up from the two step results at a length of 16. The "two step" result shown above derives itself from the basic one step vertical result shown below because any result at a some length x, can also be found at equal divisions of the primary length divided by the search term step. So at a primary result of length 16, we find the same results at:

- Length 8, Step 2
- Length 4: Step 4
- Length 2: Step 8
- Length 1: Step 16



To see all the derived step results from this primary result #8, we need to set the Max Row Steps to 16. When you rerun the search with this setting, you will see all the expected derived results.





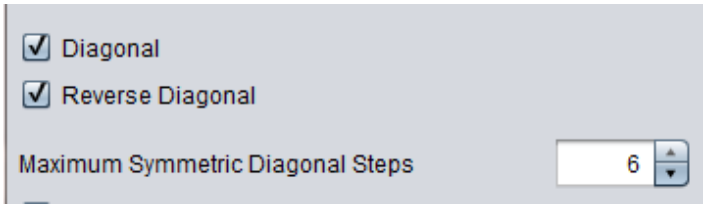
5.5.2 Horizontal

Horizontal searching has applicability only for searching within a matrix. The reason is that a basic horizontal result is nothing more than a vertical result at EDLS length 1 row step 1. Since

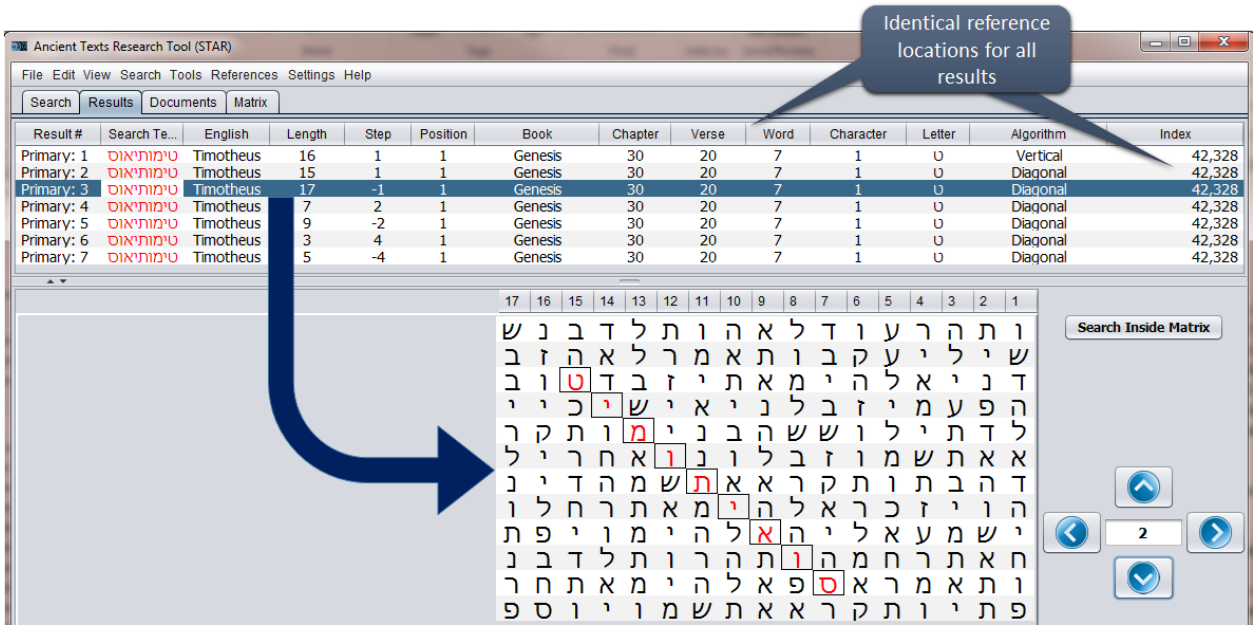
all other result types derive from a basic vertical step, this result is not very interesting for primary search terms; however, horizontal results become very interesting for searches within a matrix. We leave our discussion of horizontal searches to that section.

5.5.3 Diagonal

A diagonal result is another form of a vertical result that can be displayed in matrix at some offset from the length and at a particular horizontal step. You can generate and display these derived results using the controls shown to right provided on the *Search Algorithm Dialog.*



The following shows an example of a primary search of the *Timotheus* search term where we have opened up our Diagonal search settings as shown above where we have checked the Forward Diagonals and Reverse Diagonals options, and set "Maximum Symmtric Diagonal Steps" to six (6) steps.



Notice in the snap that each of the results have identical reference locations, i.e., Genesis 30: 20 at absolute search array index 42,328. That is because all of these results are indeed identical. STAR has simply provided the means for you to display them differently in your matrix.

Forward Diagonal

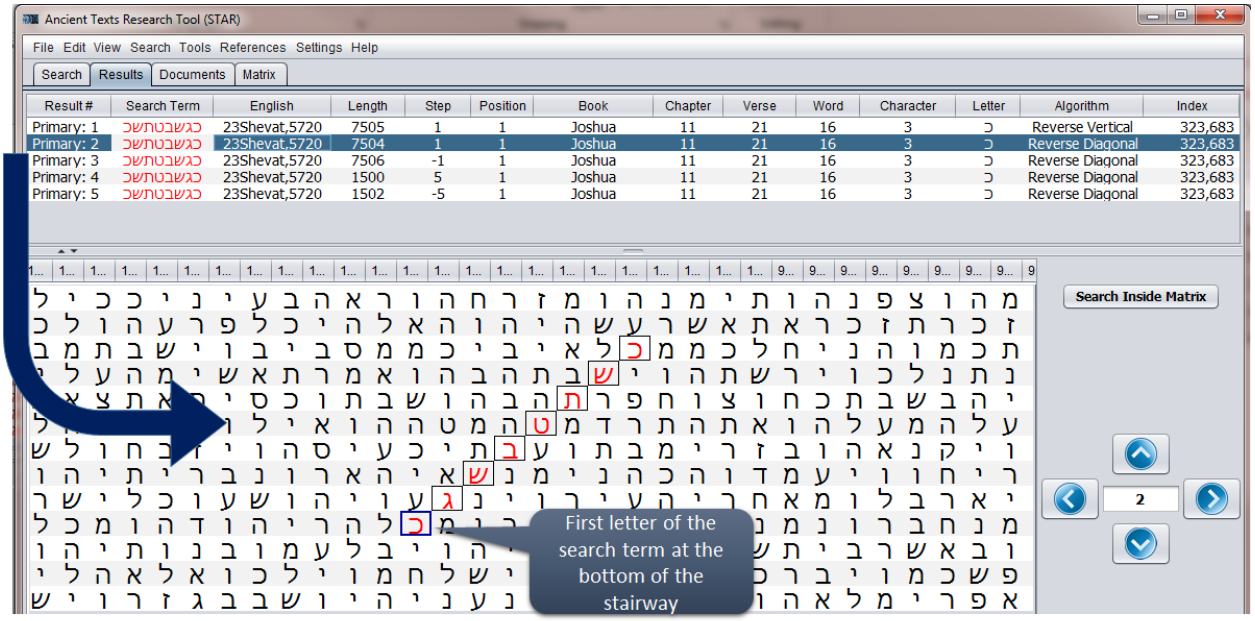
Setting this checkbox will enable diagonal results of your search term in a forward direction at some EDLS length and step. You may think of a *symmetric step* much like you would a stairway. One (1) diagonal step of a forward diagonal results means that each consecutive character of your search term is found one step down and one step to the left or right. A positive step

indicates a step to the right, while a negative value of the step means a horizontal step to the left. If you have a result showing two (2) steps, you would see the result in your matrix with consecutive characters of your search terms two rows down the matrix, and two columns either to the right.

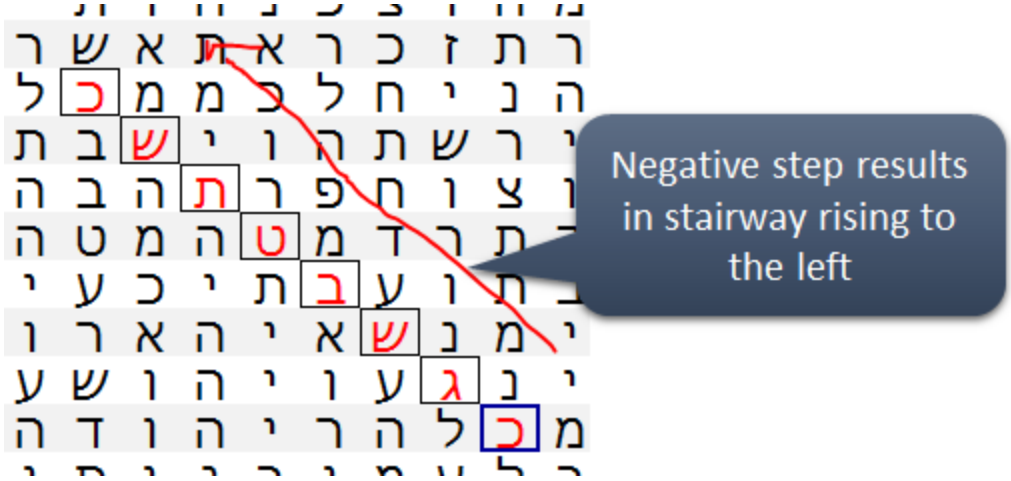
Reverse Diagonal

Selecting the *Reverse Diagonal Checkbox* setting will enable STAR to find results where the search term is reversed, i.e., the characters of the term will be viewed bottoms up. A diagonal will be formed like a staircase with the first letter of the search term at the base of the stairs. Each consecutive letter will then climb the stairway, in symmetric stepped pattern of equal rows to equal horizontal column steps.

In order for a Reverse Diagonal result to exist, there must be a reverse vertical result from which it can derive these diagonals. The snap below shows an excellent example where the CK birthday query was used to produce a derivative diagonal result from the primary reverse vertical result. A positive step of 1 indicates that the stairway will rise from left to right.



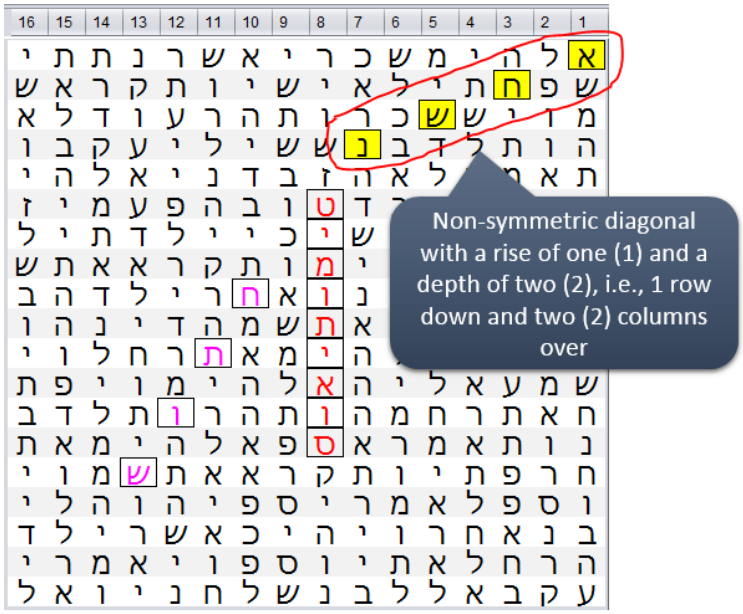
A negative step result will show a stairway rising to the left. The snap below shows Primary:3



result.

Maximum Diagonal Steps

5.5.4 Non-Symmetric Diagonal Stepping

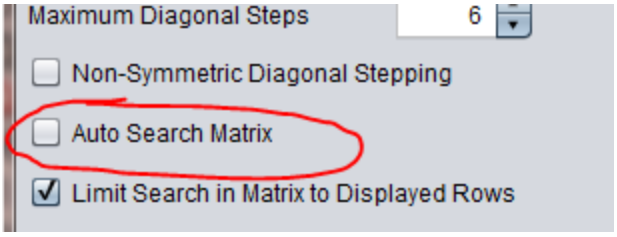


This option is now available with STAR V 1.2.0 (released 01/02/2018) for searching within a matrix. The use of this option enables you to display diagonals with stair rises (row climbs) different from the tread (aka depth) of the stair measured in columns. For example, you have the ability to search for diagonals that rise one row up or down and then two columns to the right or left for each consecutive character of the search term. This would be designated a "Rise = 1: Depth=2" diagonal (as shown in the snap above). Although we call it non-symmetric, it still forms a symmetric pattern in your matrix view. The separation of your letters are still equally spaced at some equidistant spacing.

A more detailed description on how to use this feature is explained Section 7.6.5 Non-Symmetric Diagonal Search within a Matrix.

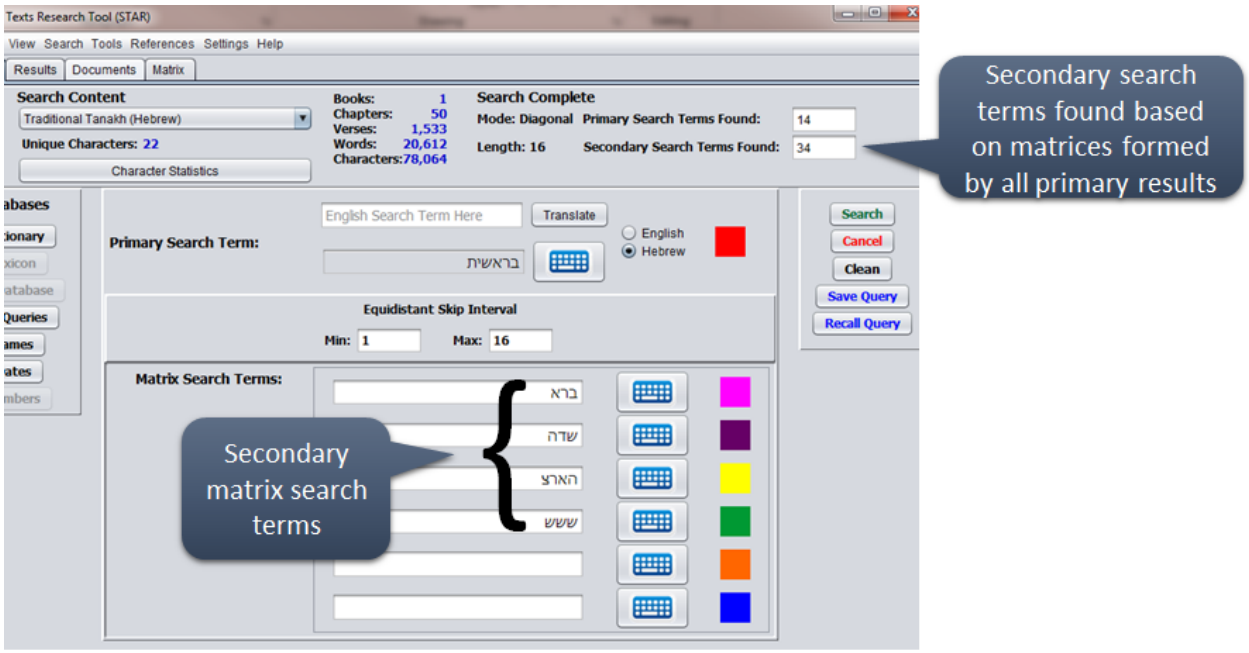
A more complex form of the non-symmetric stepping is when the treads of the stairway follow a different rising pattern based on a non-symmetric growth algorithm, e.g., a Fibonacci sequence, prime numbers, etc. Although not visually symmetric, the diagonal would be following an ordered pattern that could be detected for synchronicity. There is significant interest in these results because they indicate greater intelligence and technology of the source that originally implanted the encrypted results.

5.5.5 Auto-Search Matrix

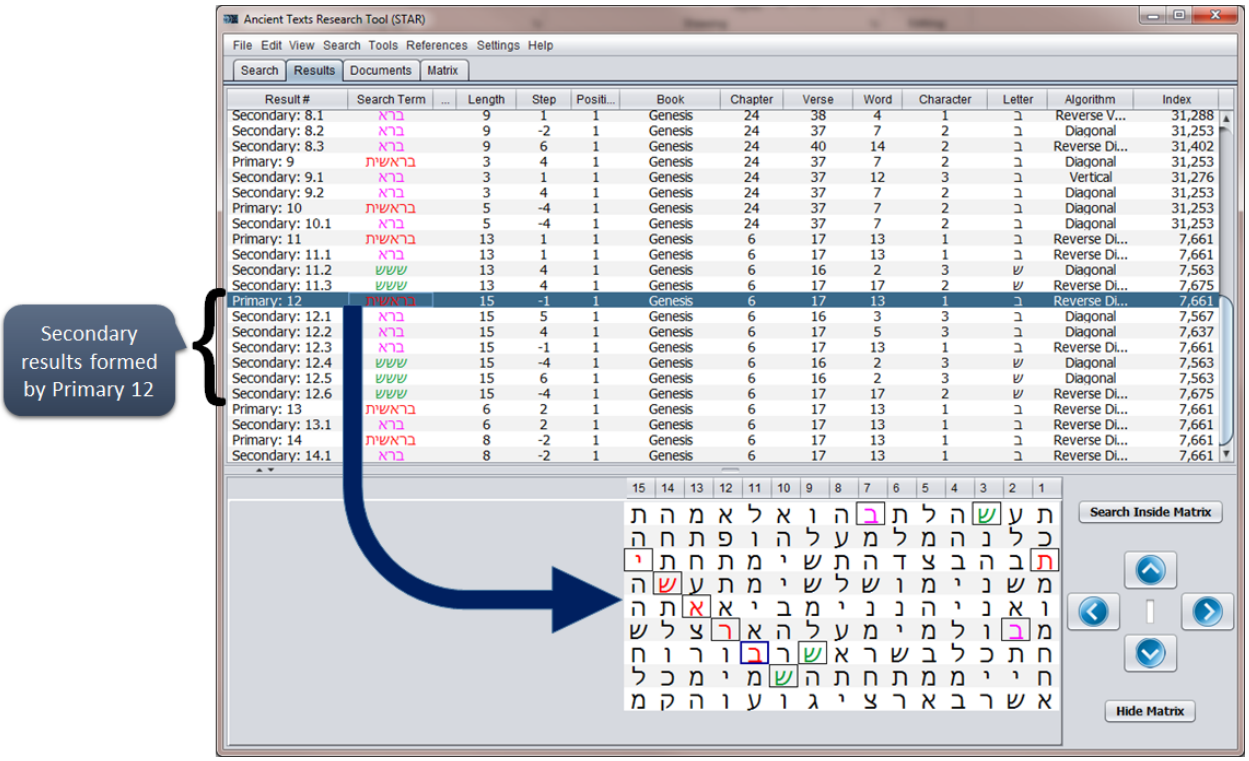


The Auto Search Matrix option provided on the *Search Algorithm Settings Dialog* enables you to perform searches of secondary terms while doing a primary search from the *Search Pane*. If you already know what you are seeking within a matrix formed by your primary result, this technique for searching can save you a lot of time searching for secondary results formed by your primary. This is one of the reasons why the Matrix Search Term fields are made available on the primary *Search Pane* (vice being placed only in the *Search Within a Matrix* view).

The following snap shows a rather bogus test case where Auto Search Matrix was selected while four (4) secondary matrix search terms were provided.



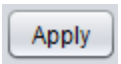
By performing search in this way, all the results are immediately ready for viewing in the Results Pane. The snap below shows some of these results in the *Results Pane*. Note how the results are grouped and labeled as designated in the "Result #" column. The notation "Secondary 12:1" implies that the results is the first secondary result derived from from "Primary: 12" result. Each of the Secondary 12:* results will all have the same column length value as "Primary: 12" result because they were derived from the matrix of length and bounded by the row padding (if *Limit Search in Matrix to Displayed Rows Checkbox* was selected).



5.5.6 Limit Search to Displayed Rows

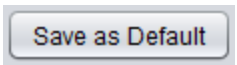
This option is explained in section of [Searching Within a Matrix.]

5.5.7 Apply

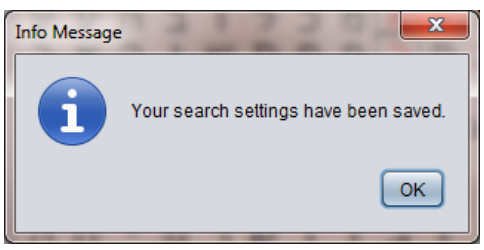
Selecting the 

button will save your option settings to the session, but not close the dialog. This can be a handy feature when you perform trial and error techniques on your searching. By keeping the dialog open and off to one side of your desktop, you can make changes on the fly and continue to search from the *Search Pane*.

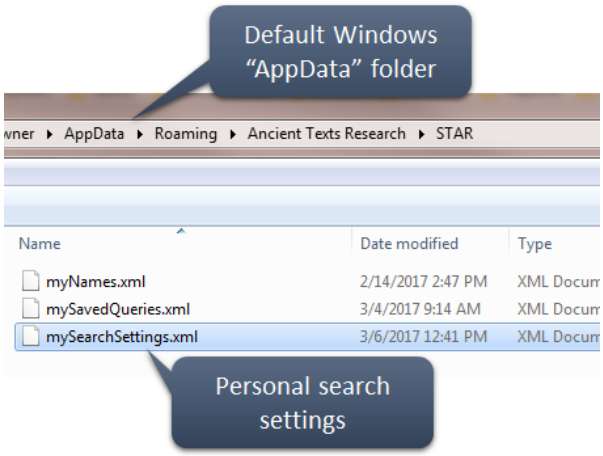
5.5.8 Save as Default

Saving the settings to default using the 

button will save these settings for the current setting and future STAR



sessions. Upon a successful save of the settings, you will receive a confirmation dialog.



The settings are saved in a file to your default AppData folders based on your operating system. For the Windows OS, you will find that folder typically under `C:\Users\UserName\AppData\Roaming`, "`UserName`" is your login. From that folder navigate to the "`Ancient Texts Research\STAR`" folder. You will see a number of XML files unique to your account. This is handy to know since you have the ability to modify these XML files by hand using a text editor, or the ability to share the files among your research partners who may want to duplicate your environment for producing a similar result.

Geek Speak

5.5.9 Restore My Defaults

Selecting the Restore My Defaults button will restore your search settings from the last save you made of the search settings.

5.5.10 Restore from Factory Defaults

Selecting Restore from Factory Defaults will restore default settings as configured in the factory install of the STAR software. Selecting this will only restore these settings for the session. If you want these settings to persist between sessions, either save these restored settings as default using the "Save as Default" button, or delete the *mySearchSettings.xml* file stored for your account.

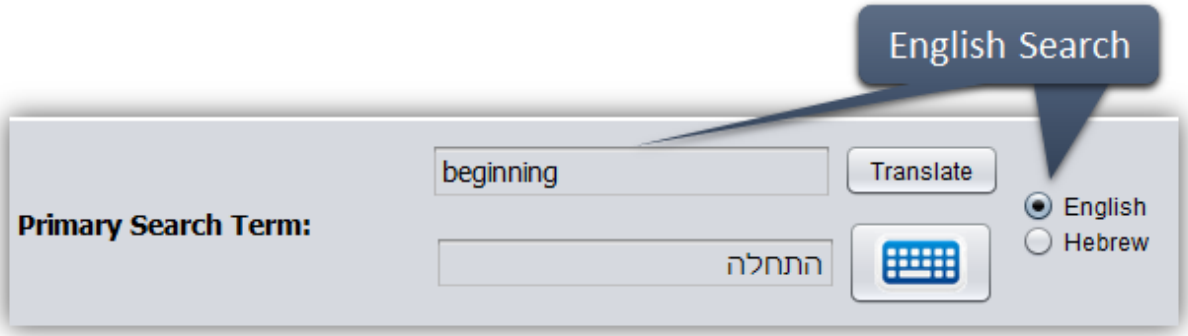
5.5.11 Ok

Selecting the OK button will save the setting changes to the session and close the dialog.

5.5.12 Cancel

Selecting this will close the dialog and ignore any changes you made within the dialog.

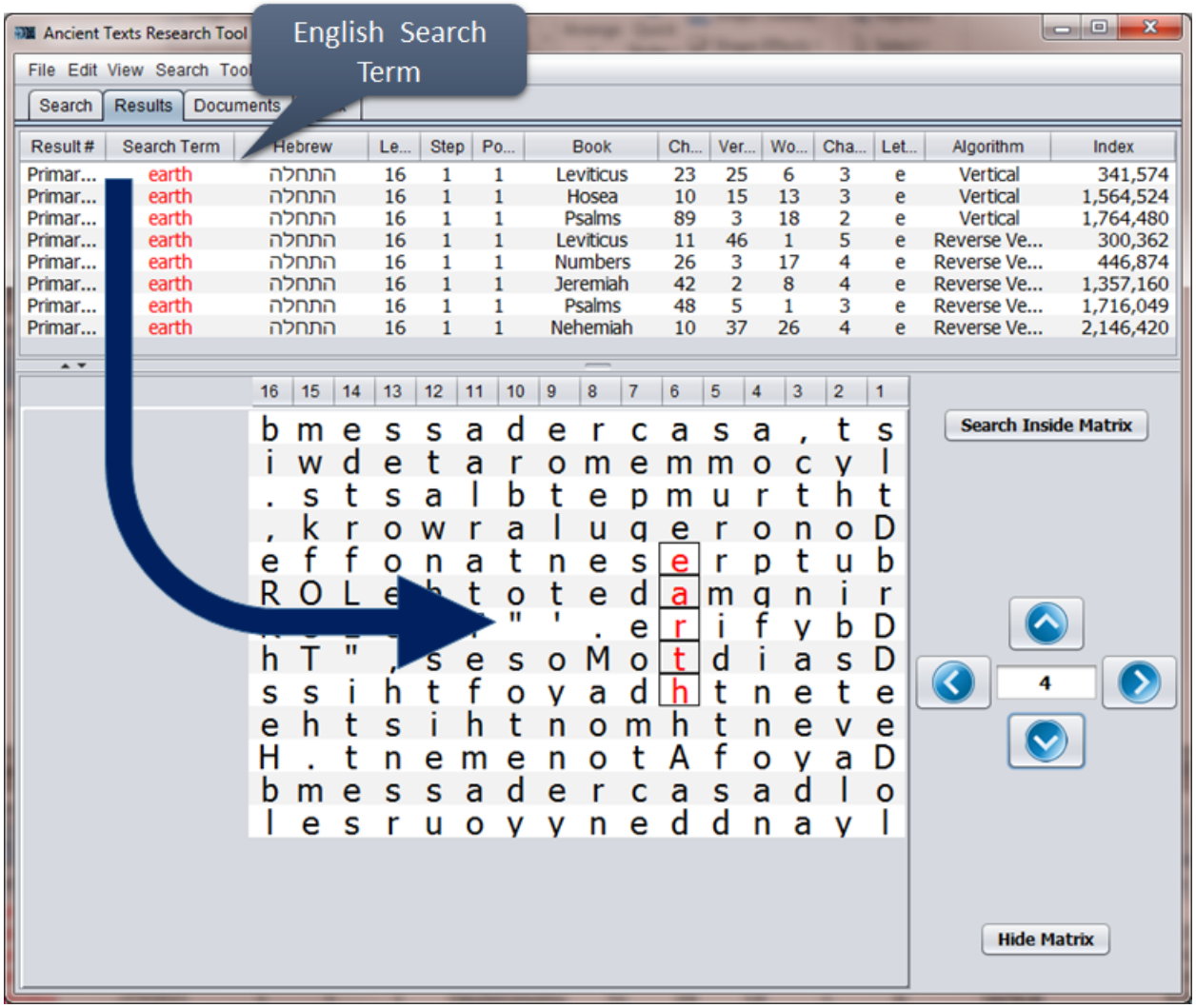
5.6 Hebrew/English Search



STAR can perform search on English search terms in the same manner it searches for Hebrew. The key to making this work is that you select the *English Radio Button* as shown above. With English selected, STAR knows to use the upper primary search term field for the search term to be checked and it will check that English search term against the paired English reference text.

For example, when you have the Leningrad Codex selected as your reference document, an English search will be conducted on the NIV Old Testament, because that is its default pairing. You can inspect the English pairing via the *Documents Pane* as shown in the snap below.

The Search Pane will show that the English field was used as the primary search term and that the matrix has been filled from the English search array letter sequence where the results were found.



5.7 Queries

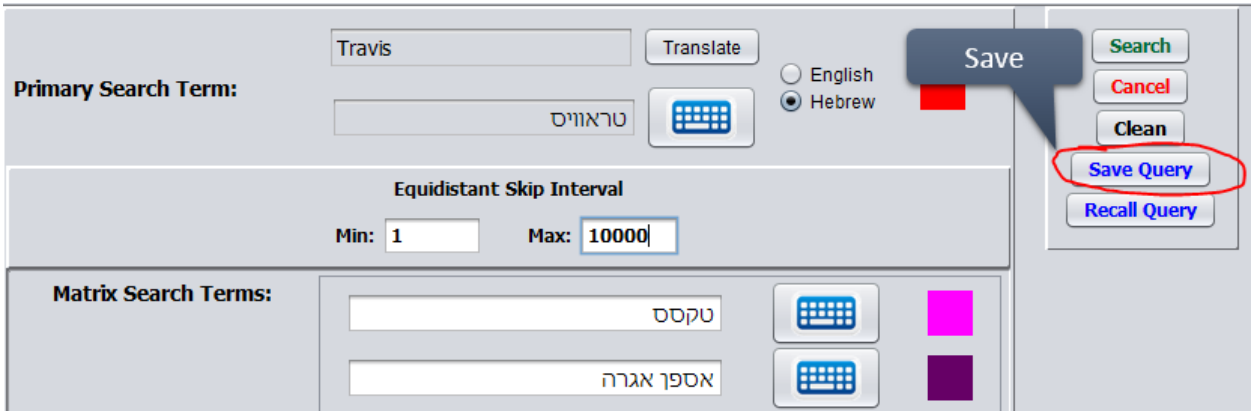
STAR provides several means for you to save, recall, and manage queries. Queries are composed of all the search terms and controls used for a particular search. This is an extremely useful feature if you need to be constantly returning to a previously performed primary search from a previous session and need to perform additional investigations of the resulting matrix from that initial search. This is also handy if you are in the practice of sharing your results with friends or research partners. STAR enables you to save any particular query to an XML formatted file that can be shipped off in an email and then imported into STAR by the recipient.

The first step in that process is to save your query. That is explained as follows.

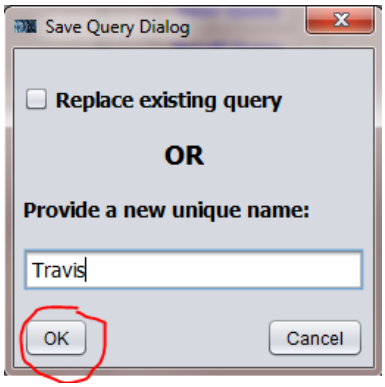
5.7.1 Save Query

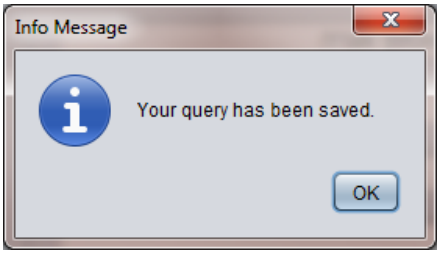
After you have entered in your search terms, EDLS settings, and are satisfied with the search, use the Save Query button  on the Search Pane to save your query as shown.

Note in this example we'll be saving the "Travis Test" case used from the Quick Start section with some additional secondary matrix terms added to the mix.

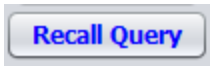


You will be prompted with the Save Query Dialog where you can provide a unique name for your query, in our case *Travis*. If you are replacing an existing query, you need to select the "Replace existing query" checkbox. Upon success, you should be presented with the following dialog:

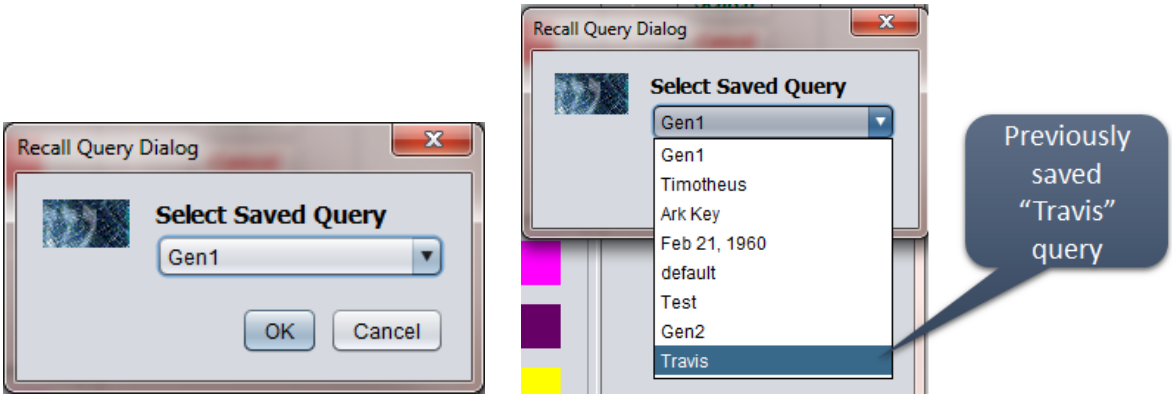




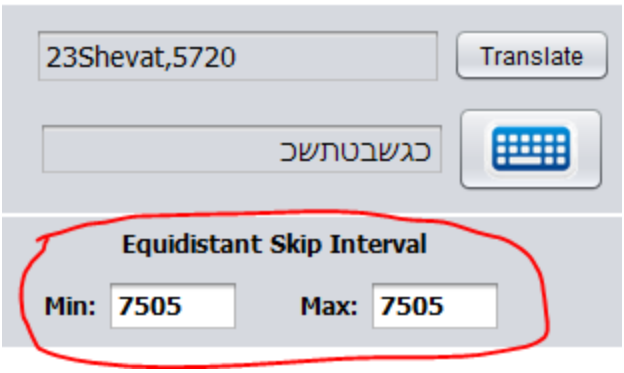
5.7.2 Recall Saved Query

Now that you have saved your query, test that you can restore it via the Recall Query button 

. Your queries will persist between sessions, so you can test this by either changing up the search parameters in view, or shutdown STAR and boot it up again. After selecting the Recall Query button, you will be presented with the Recall Query Dialog. You should find your most recent saved query at the bottom of the list of queries available from the combobox list selection control as shown.

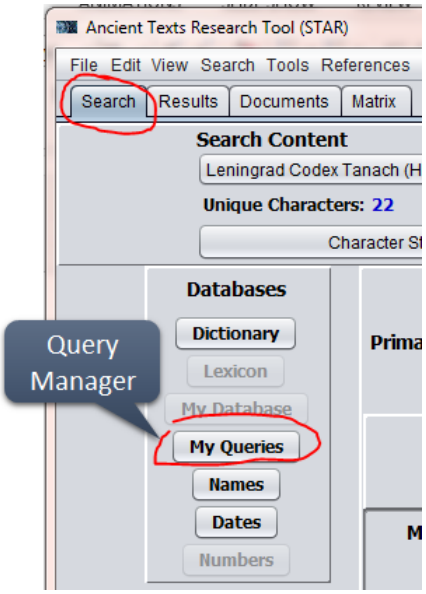


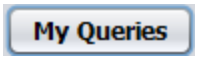
All of your previous search term parameters will then be restored to the Search Pane and you can immediately conduct a search.

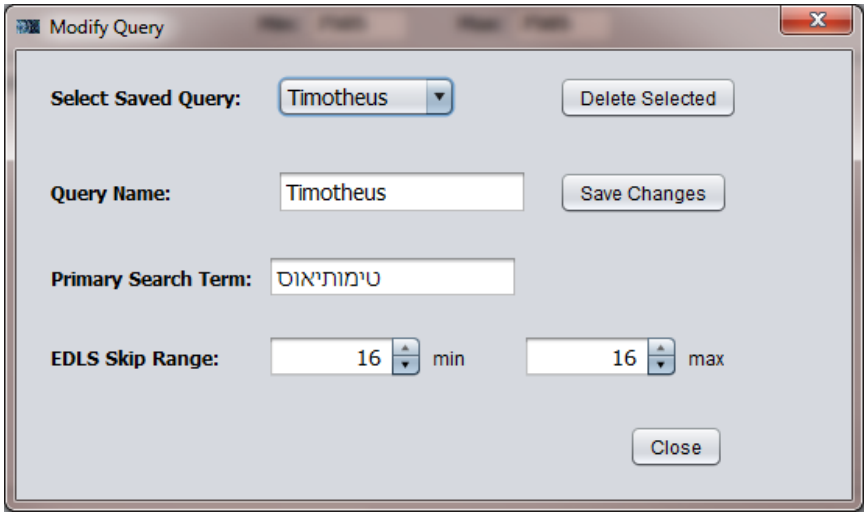


If you have learned that a particular search term is found at a very large EDLS skip setting, (e.g., the birth date query used in CK with a skip of 7505), you may want to save this query at exactly the skip setting for which the term was found. In the example above, you will see the "Feb 21, 1960" query in our list of saved queries. When that query is restored to the Search Pane, it is at an EDLS range between 7505 and 7505. This means Search will only search at one length. This makes for a quick search and display of this unusual finding from CK and convenient means to begin searching terms inside the matrix.

5.7.3 My Queries Manager

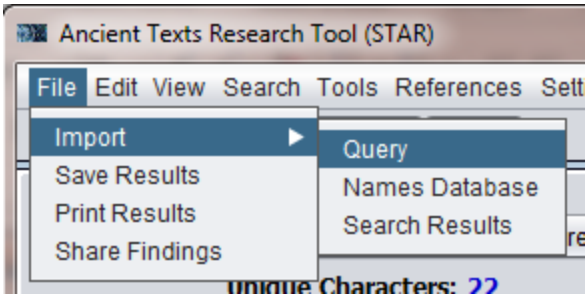


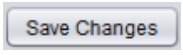
STAR provides a dialog that can be utilized to modify, delete, and save changes to previously saved queries. You can access this tool via the *My Queries* button  located on the Search Pane as well as from the Tools Menu. The *Modify Query Dialog* will be presented which provides the aforementioned functions.



5.7.4 Import Query

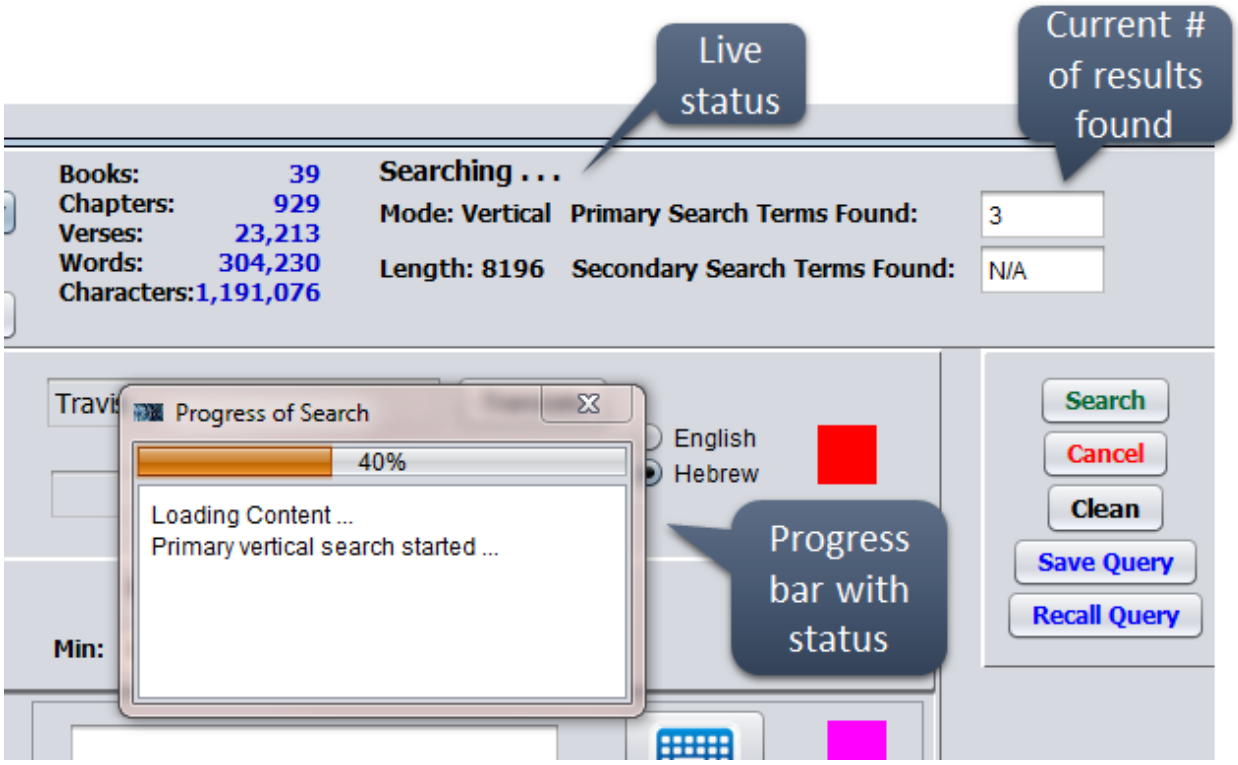
The importing of a query is provided via the Main Menu File ⇒ Import ⇒ Query menu option as shown. You will prompted with a file selection dialog for which to select the query you wish to import.



Once you have imported the query file, all the queries from that exported query file will be added to your active in memory query list. You can then select from those queries just like you would any of your pre-defined queries. If you want to retain the additional queries between STAR session, use the *Save Changes Button*  on the *Modify Query Dialog*.

5.8 Search Progress

This topic was touched on lightly in the Quick Start Section of this manual. A few additional words of elaboration are provided here.



5.8.1 Progress Bar and Status Dialog

When you launch a search, a progress bar will appear with a text area as shown that updates with search status as the search progresses. If you conduct a very small search, you may not be able to see it since the search happens so quickly. For searches with long EDLS Range settings, this feature is very handy for providing feedback to you about the progress and whether or not you may want to cancel the search and take a different approach. As the search completes a phase of the search, the completed phase is updated in the status dialog (e.g., "Primary vertical search completed . . .").

5.8.2 Search Pane Status

On the upper part of the Search Pane you will also see status of the search flashing changes as it counts through iterations of EDLS skips and as it moves on to different search algorithms.

5.8.3 Results Status

As results are found, they will be immediately posted to the *Search Terms Found* fields on the upper right of the pane.

5.8.4 Cancel

The Cancel button 

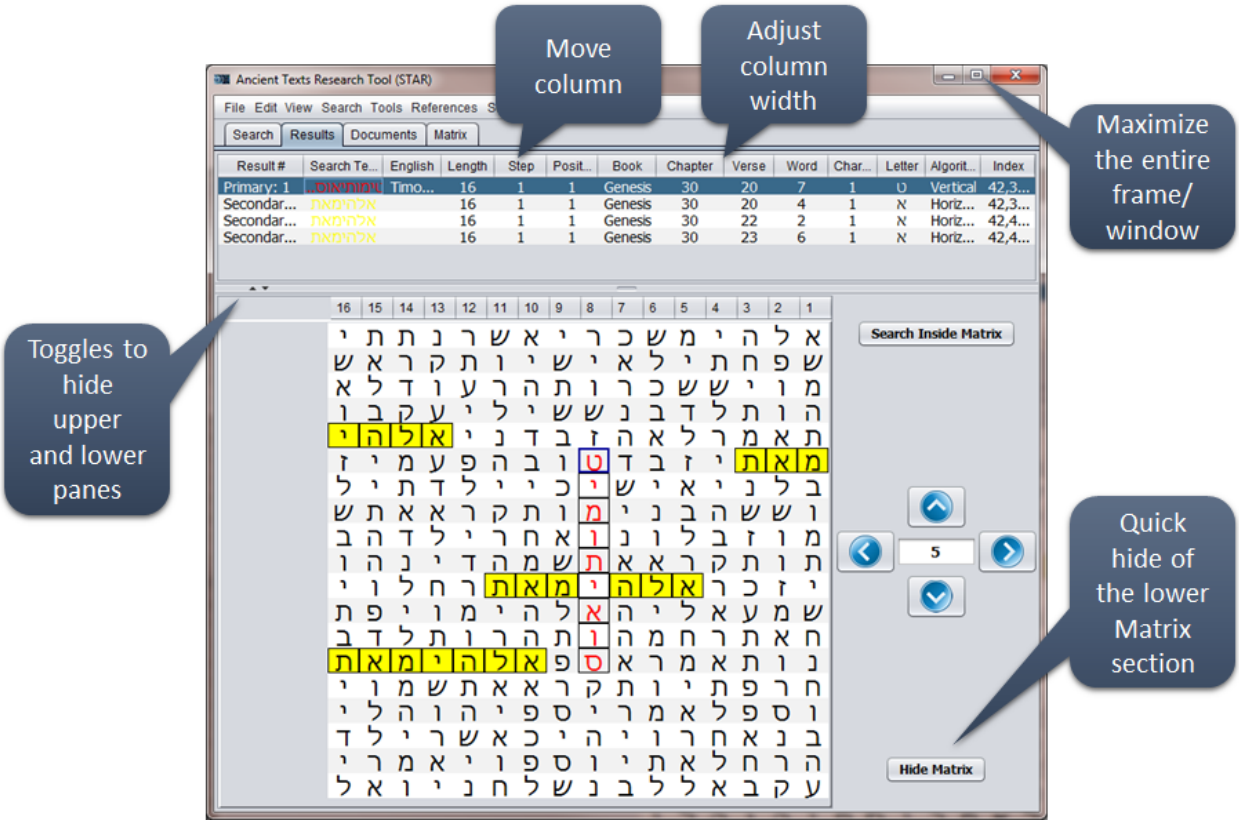
provided on the Search Pane is wonderful feature to use when you get into a search and find that you may have bitten off just a little too much than you can chew. The Progress Status Bar will give you a feel very quickly whether you will be waiting five minutes for a search to complete or five days.

6 Results Pane

This section provides a detailed description of all the features you will find on the Results Pane. If you have skipped over the Quick Start section discussing the Results Pane, you may want to return to it for a quick overview.

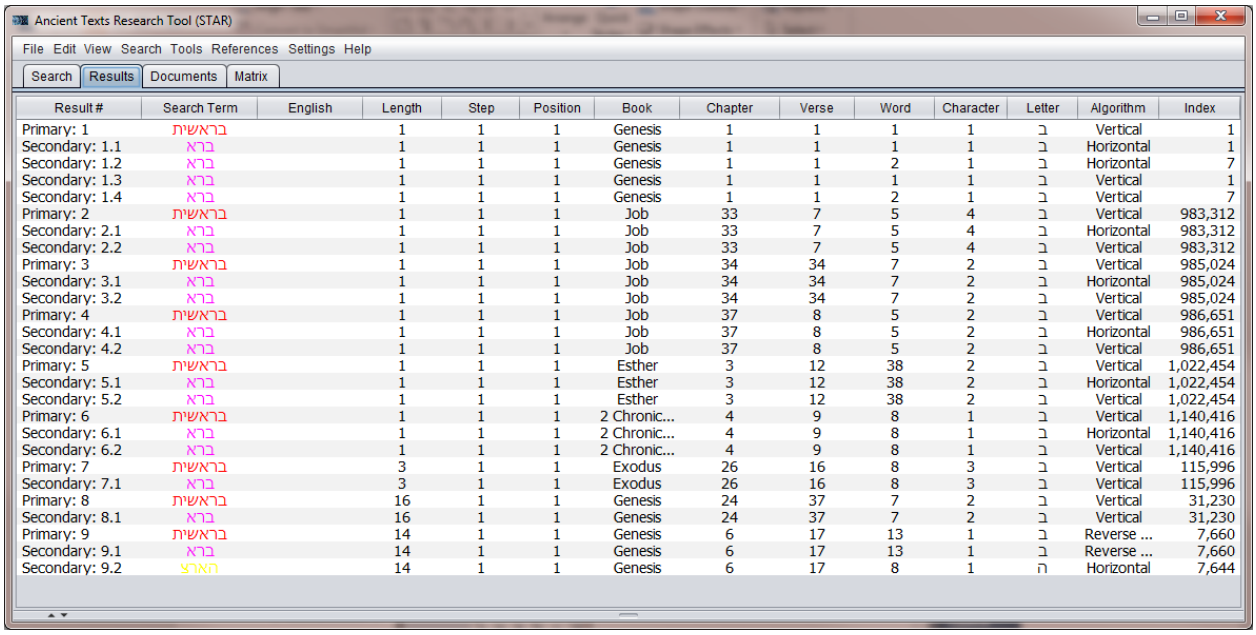
6.1 Viewing Toggles

The *Results Pane* provides a display of both the *Results Table* and the corresponding matrix. The Pane has several controls that will enable you to hide components of the panel so that you can maximize the sections of greater interest.



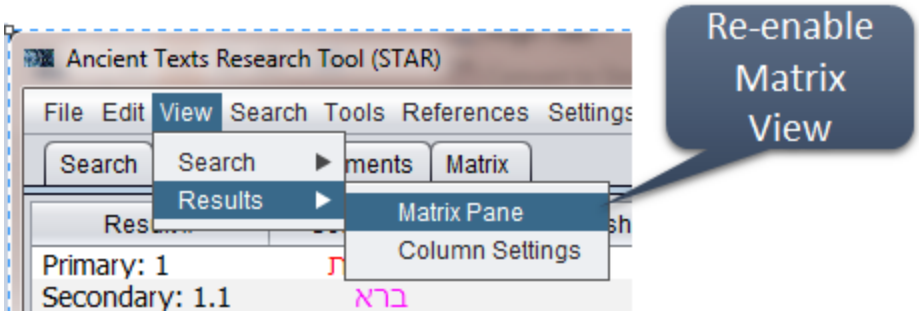
6.1.1 Hide Matrix Toggles

Since you may want to focus most of your attention on the *Result Table* in the upper half of the frame, the Pane has several toggles that will allow you to hide the lower half of the Pane showing the matrix. The Hide Matrix in the bottom right of the Pane can be selected to quickly hide the Matrix. This is extremely handy when you need the entire Pane to view numerous results.

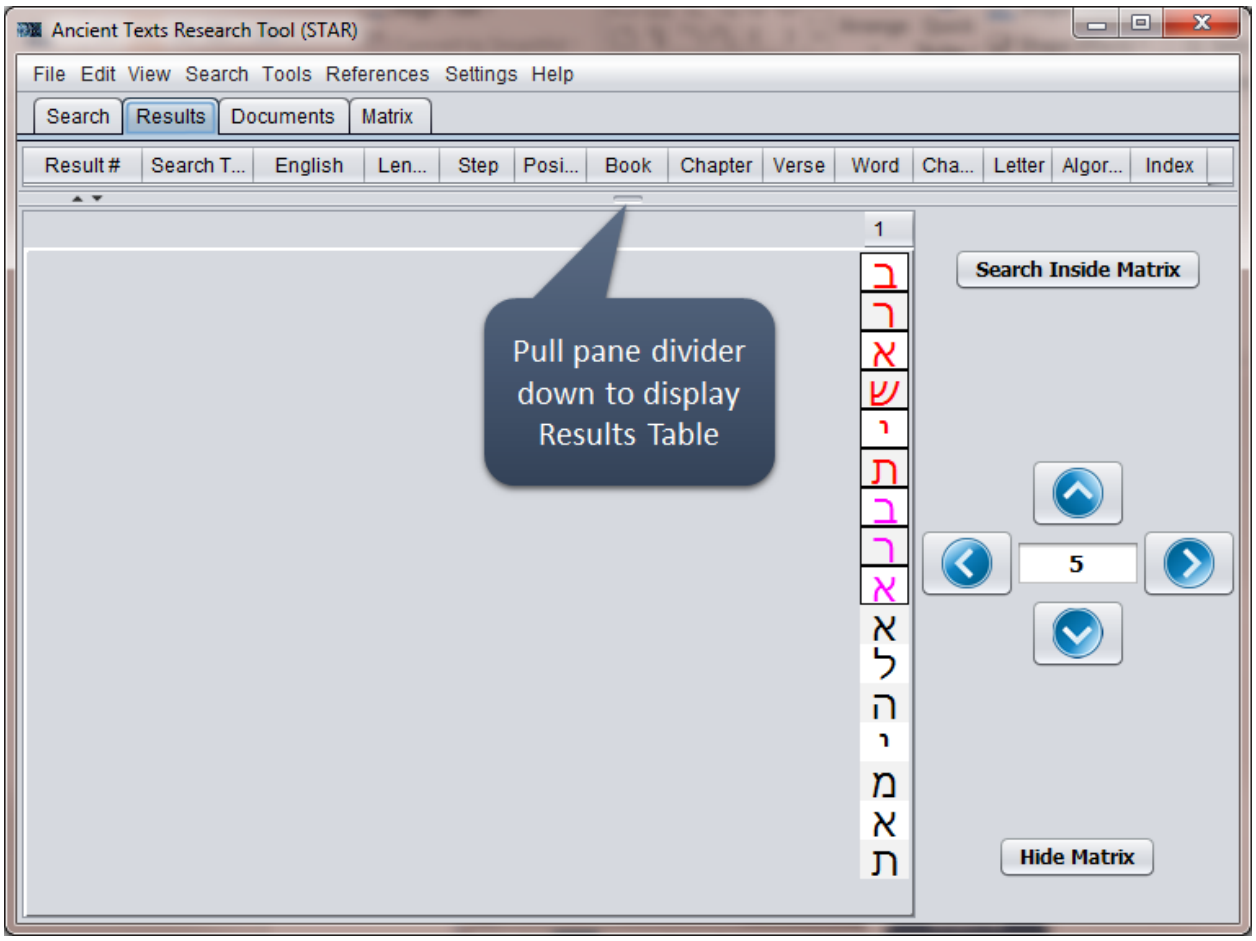


Result #	Search Term	English	Length	Step	Position	Book	Chapter	Verse	Word	Character	Letter	Algorithm	Index
Primary: 1	בראשית		1	1	1	Genesis	1	1	1	1	ב	Vertical	1
Secondary: 1.1	ברא		1	1	1	Genesis	1	1	1	1	ב	Horizontal	1
Secondary: 1.2	ברא		1	1	1	Genesis	1	1	2	1	ב	Horizontal	7
Secondary: 1.3	ברא		1	1	1	Genesis	1	1	1	1	ב	Vertical	1
Secondary: 1.4	ברא		1	1	1	Genesis	1	1	2	1	ב	Vertical	7
Primary: 2	בראשית		1	1	1	Job	33	7	5	4	ב	Vertical	983,312
Secondary: 2.1	ברא		1	1	1	Job	33	7	5	4	ב	Horizontal	983,312
Secondary: 2.2	ברא		1	1	1	Job	33	7	5	4	ב	Vertical	983,312
Primary: 3	בראשית		1	1	1	Job	34	34	7	2	ב	Vertical	985,024
Secondary: 3.1	ברא		1	1	1	Job	34	34	7	2	ב	Horizontal	985,024
Secondary: 3.2	ברא		1	1	1	Job	34	34	7	2	ב	Vertical	985,024
Primary: 4	בראשית		1	1	1	Job	37	8	5	2	ב	Vertical	986,651
Secondary: 4.1	ברא		1	1	1	Job	37	8	5	2	ב	Horizontal	986,651
Secondary: 4.2	ברא		1	1	1	Job	37	8	5	2	ב	Vertical	986,651
Primary: 5	בראשית		1	1	1	Esther	3	12	38	2	ב	Vertical	1,022,454
Secondary: 5.1	ברא		1	1	1	Esther	3	12	38	2	ב	Horizontal	1,022,454
Secondary: 5.2	ברא		1	1	1	Esther	3	12	38	2	ב	Vertical	1,022,454
Primary: 6	בראשית		1	1	1	2 Chronic...	4	9	8	1	ב	Vertical	1,140,416
Secondary: 6.1	ברא		1	1	1	2 Chronic...	4	9	8	1	ב	Horizontal	1,140,416
Secondary: 6.2	ברא		1	1	1	2 Chronic...	4	9	8	1	ב	Vertical	1,140,416
Primary: 7	בראשית		3	1	1	Exodus	26	16	8	3	ב	Vertical	115,996
Secondary: 7.1	ברא		3	1	1	Exodus	26	16	8	3	ב	Vertical	115,996
Primary: 8	בראשית		16	1	1	Genesis	24	37	7	2	ב	Vertical	31,230
Secondary: 8.1	ברא		16	1	1	Genesis	24	37	7	2	ב	Vertical	31,230
Primary: 9	בראשית		14	1	1	Genesis	6	17	13	1	ב	Reverse ...	7,660
Secondary: 9.1	ברא		14	1	1	Genesis	6	17	13	1	ב	Reverse ...	7,660
Secondary: 9.2	האר		14	1	1	Genesis	6	17	8	1	ה	Horizontal	7,644

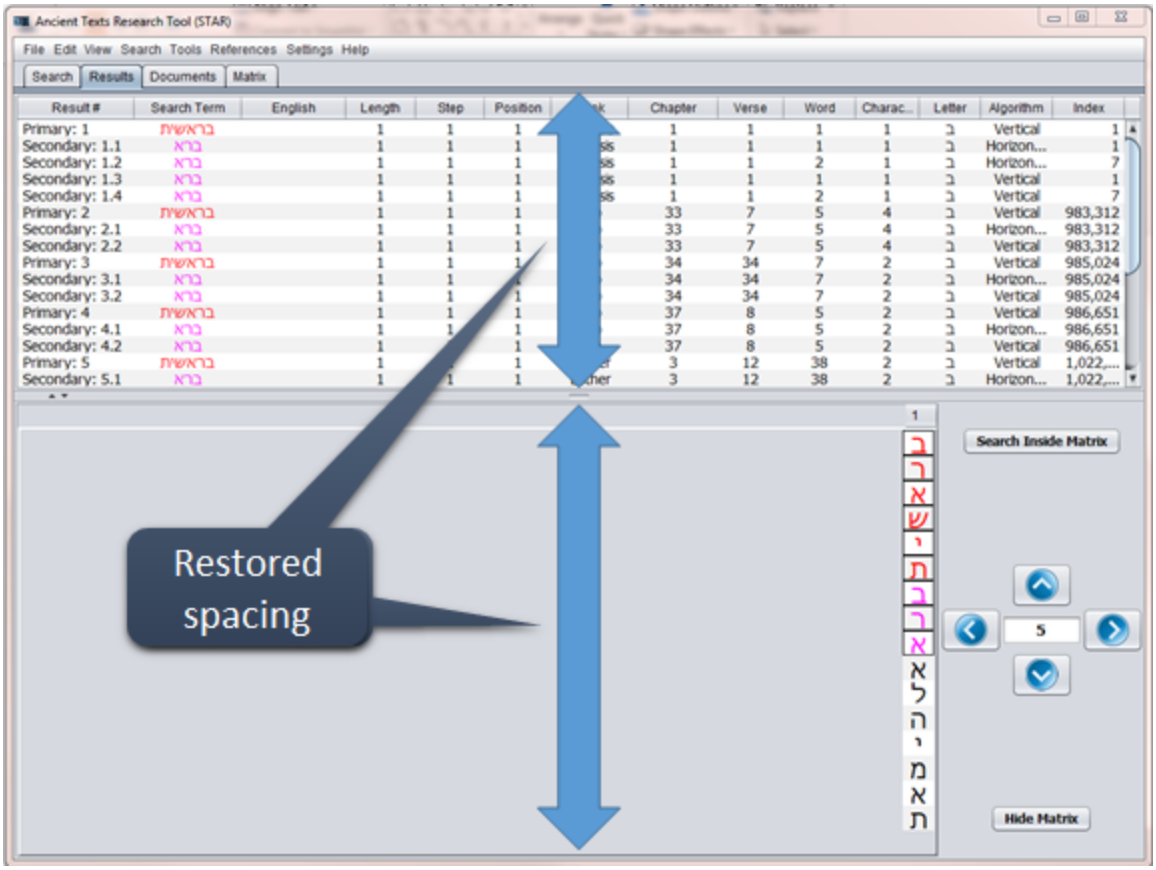
To reenable the Matrix back into view after using this button, you should select View ⇒ Results ⇒ Matrix Pane menu item as shown.

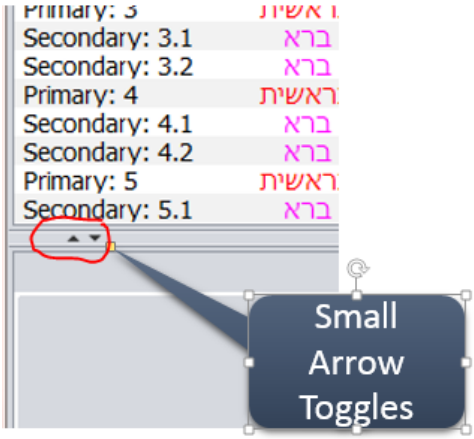


The matrix shown in the lower half of the Pane is constructed based on the row you have selected from the *Results Table*. Your table results should come back into view. If your restored view has cut-off the *Results Table*, you will need to mouse click on the pane divider as shown in the snap and drag the divider down.



The pane should be restored to your liking as shown.

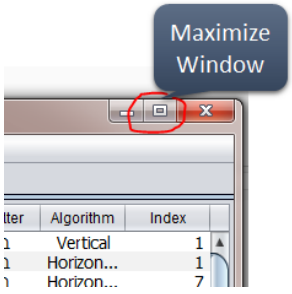




The small arrow toggles found to the far left of your pane divider will provide the ability to either hide the results table or the lower matrix table. They do an excellent job of restoring your previous view when you use the toggles to restore a previously hidden section of the *Results Pane*.

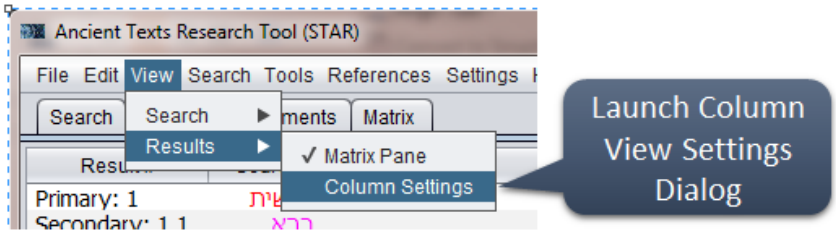
6.1.2 Results Table Controls

The upper half of the *Results Pane* showing the *Results Table* has several features you should be aware of that will help you explore the table results. The most important feature is one you are probably already aware of; and that is, the toggle to maximize your Main Home Frame, which may look different depending on your operating system's look and feel styles. The important thing to note is that you may need to maximize your viewing space to your entire desktop in order to facilitate your ability to sift through all the available columns of the results table.



6.1.3 Hiding and Enlarging Columns of the Results Table

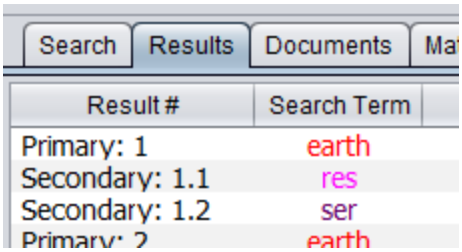
Another feature you may want to employ in sifting through the results is the ability the GUI provides in allowing you to move (i.e., re-order) columns and to hide columns. Right click of a column will provide you the ability to hide the column. Selecting and dragging the column allows you to move it. When you need to restore a column's view, use the View ⇒ Results ⇒ Column Settings menu to launch the *Column Settings Dialog*.



6.2 Results Table Column Descriptions

6.2.1 Result

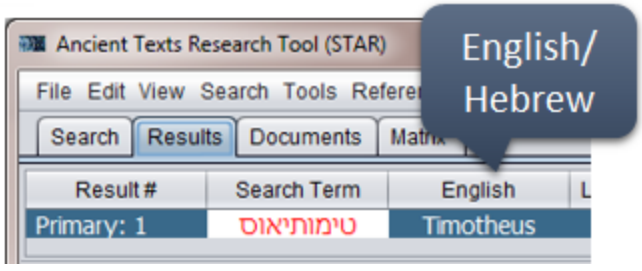
When a result is derived from a primary search term, it is defined using the convention "Primary: #". Child results are identified using the convention "Secondary X:Y", where X is the primary search number, and Y identifies each secondary result derived from the primary.



6.2.2 Search Term

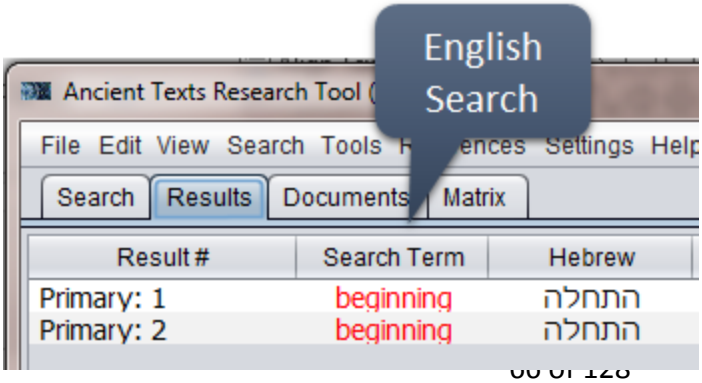
This is always the search text used to directly search the letter sequence array. When searching English, this will be English. When searching Hebrew, this will be Hebrew.

6.2.3 English/Hebrew



This column header changes based on whether you are searching Hebrew or English. When searching in Hebrew, the column will show the English equivalent of your search term if you have provided a translation, or simply filled in the upper English search field.

When conducting an English search, you will notice that the column shows the equivalent Hebrew term as shown in the snap to the right.



6.2.4 Length

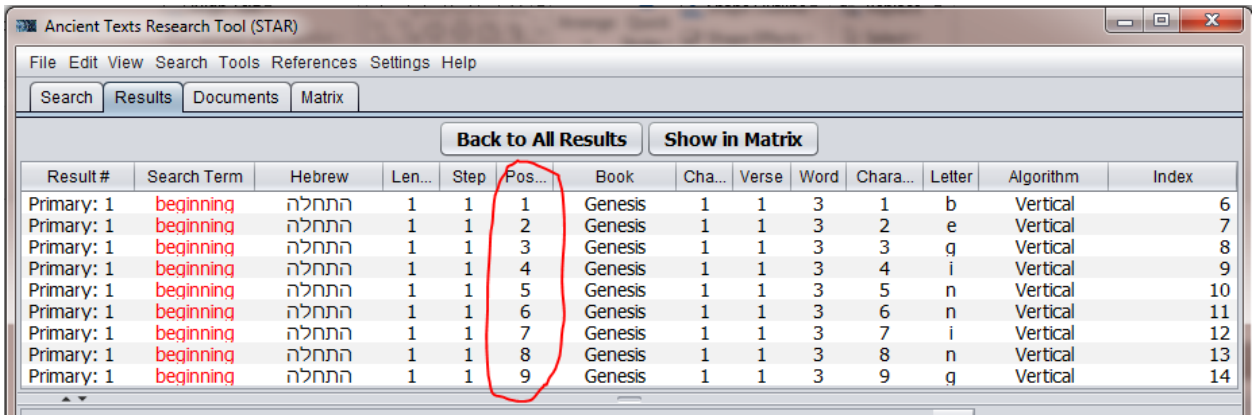
This is the EDLS Skip Distance length for which the result was detected.

6.2.5 Step

This is the algorithm stair step for which the result was detected. See the Algorithms section for a complete description of how the term Step is defined.

6.2.6 Position

This identifies the position of the search term. In summary mode, this will always be one (1), because it shows the reference location for the first letter of the search term. When you expand the result, you will see that the Results Table shows all positions of the search term.



Result #	Search Term	Hebrew	Len...	Step	Pos...	Book	Cha...	Verse	Word	Chara...	Letter	Algorithm	Index
Primary: 1	beginning	התחלה	1	1	1	Genesis	1	1	3	1	b	Vertical	6
Primary: 1	beginning	התחלה	1	1	2	Genesis	1	1	3	2	e	Vertical	7
Primary: 1	beginning	התחלה	1	1	3	Genesis	1	1	3	3	g	Vertical	8
Primary: 1	beginning	התחלה	1	1	4	Genesis	1	1	3	4	i	Vertical	9
Primary: 1	beginning	התחלה	1	1	5	Genesis	1	1	3	5	n	Vertical	10
Primary: 1	beginning	התחלה	1	1	6	Genesis	1	1	3	6	n	Vertical	11
Primary: 1	beginning	התחלה	1	1	7	Genesis	1	1	3	7	i	Vertical	12
Primary: 1	beginning	התחלה	1	1	8	Genesis	1	1	3	8	n	Vertical	13
Primary: 1	beginning	התחלה	1	1	9	Genesis	1	1	3	9	g	Vertical	14

6.2.7 Book/Chapter/Verse/Word/Character

This identifies the exact reference from where a particular letter of a search term is found.

6.2.8 Letter

Identifies the letter of your search term. This is the first letter of the search term in summary mode. In expanded results mode, all letters are shown in the results table.

6.2.9 Algorithm

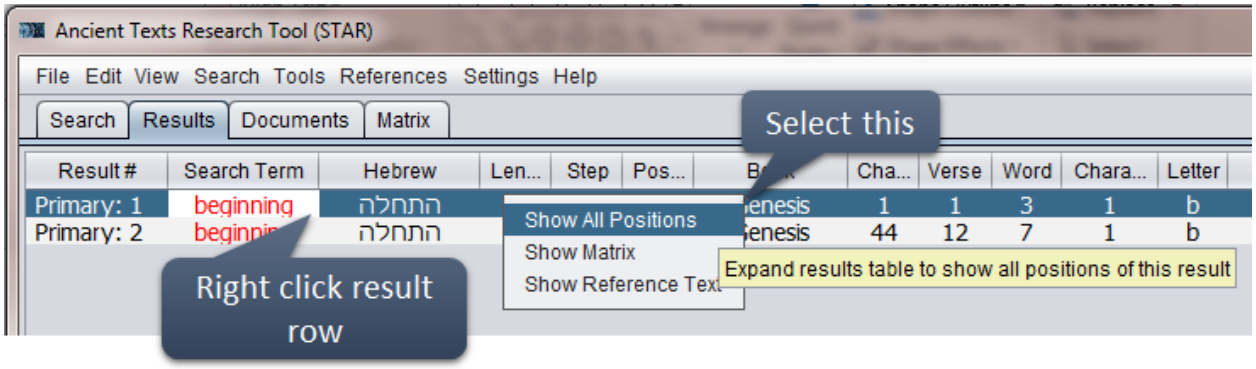
Identifies the algorithm which was used to detect the result presented.

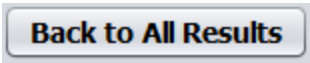
6.2.10 Index

The index defines the absolute letter location of where the result was found in the reference search array letter sequence. It shows the index of the first letter of your search term, unless you are viewing the result in Expanded Mode, which shows the absolute index location of every letter found in your search term.

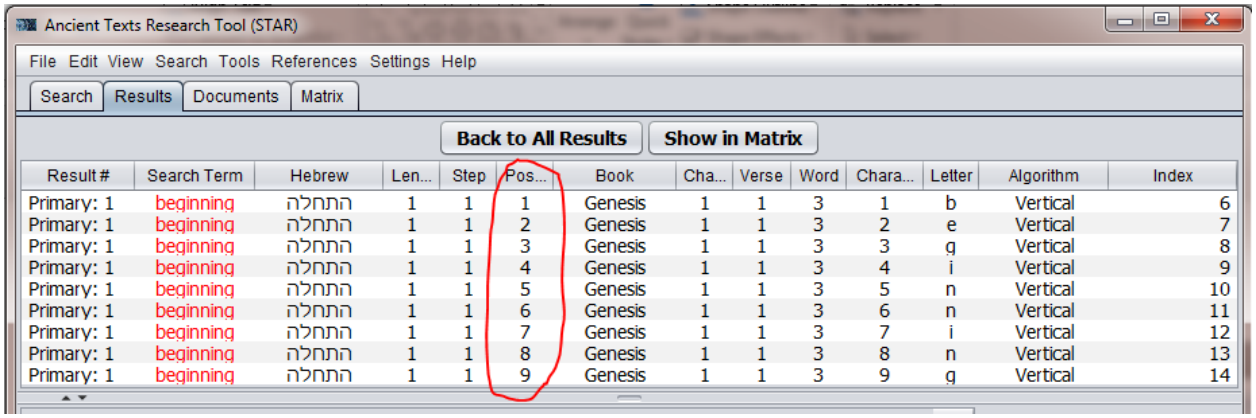
6.3 Showing All Positions

This concept of "Showing all Positions" refers to ability of STAR to display a detailed view of where each letter of your search term is located in the reference document. You navigate to the expanded results view by right clicking on a row in your results table and selecting the *Show All Positions* menu-item as demonstrated in the snap below.



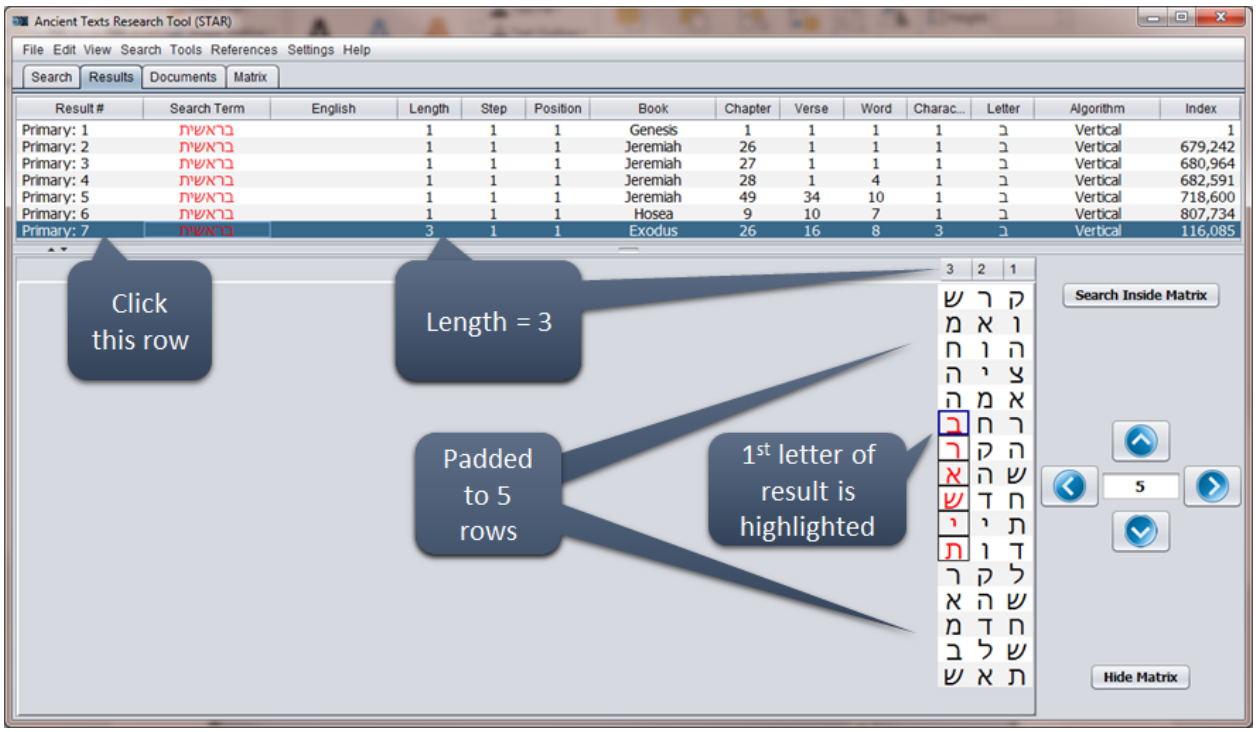
Within this view, you see only the single result and all letter positions of the search term and where each letter was found in the reference document. To return to summary view, select the *Back to All Results Button* 

.



6.4 Driving The Matrix Table

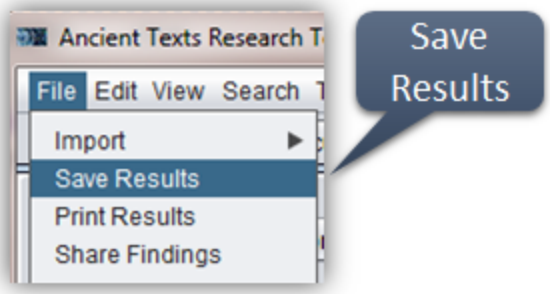
By selecting rows within your *Results Table*, you have the ability to drive (i.e., force) the view of that result in the matrix in the lower half of the pane. An example of this feature is provided here from our earlier Quick Start example where we click the result "Primary: 7" to show the underlying matrix formed at a length of three (3). The result is shown perfectly centered in the matrix by the designated pads (in this case five rows). The result is shown using designated **red** font for primary results so that it is correlated in the results table with its appearance in the matrix. The first letter of that result is bordered in **navy blue**.



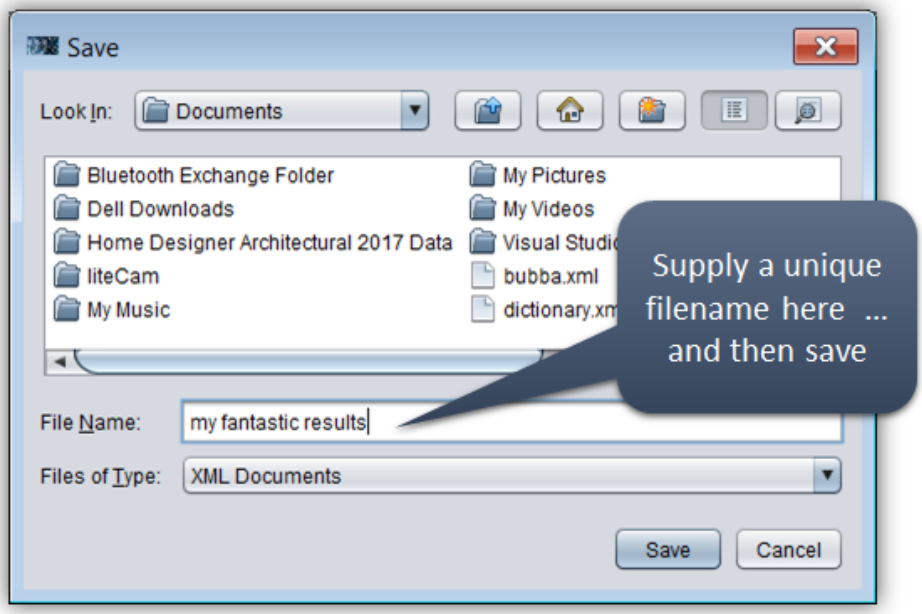
6.5 Saving and Sharing Results

STAR provides the ability for you to share your results with other users, whether they use STAR or not. If the person on the other end of the line also has a copy of STAR, this feature is even more powerful, because the results from your search can be viewed in the GUI just as they looked in your instance.

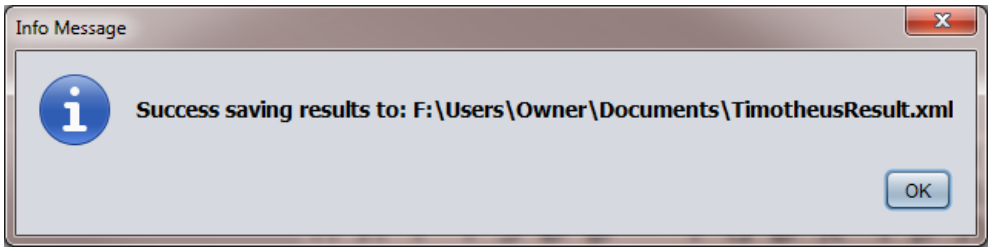
There is also a very strong use case which drove this requirement for implementation in STAR. During our efforts for evaluating the Birthdate Key (*February 21st, 1960*) referenced in CK, we needed not only a way to search on a date range that spanned months and years, but also the ability to send those results to other research partners. A search span for one year of each day at an EDLS skip range between 1 and 10,000 would require about 12 hours on a commodity desktop box. It was critical that we had a way to save those results and to share them.



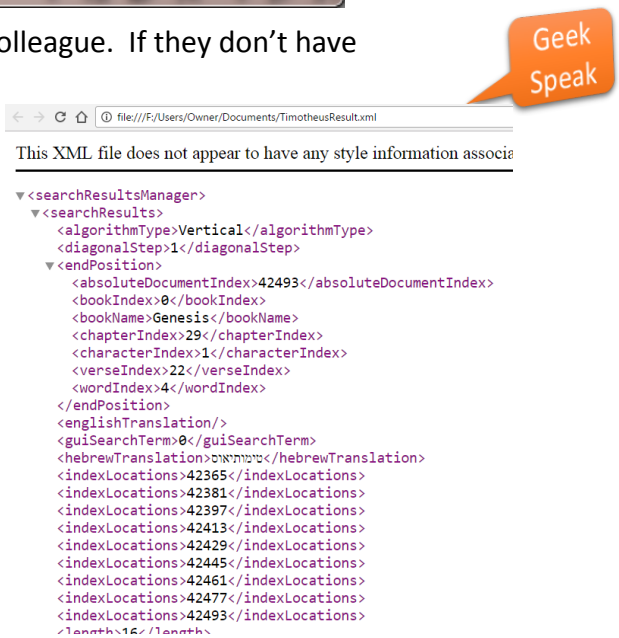
The ability to do just that is provided via the File menu as shown. You'll want to execute this after your Search is complete and you have inspected the results. A Save dialog will then be presented as shown. Provide a unique name and save. The explorer open in your default Documents folder (for Windows users).



The file will always be saved with an *.xml suffix. The confirmation dialog will remind you where the file has been saved:

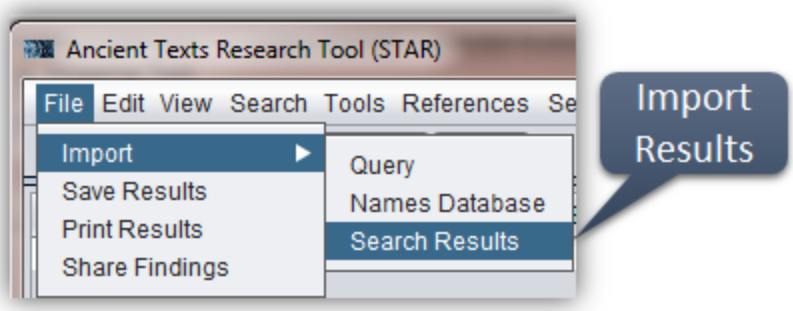


You can then attach this file to an email and send to a colleague. If they don't have STAR, they can still display XML formatted files in their browser of choice as shown. Reading through the file, you will find all the details that include the search term, the absolute index locations, and the overt file references. It may not be very pretty, but it is comprehensive.



6.5.1 Importing Results into Star

To display the received results in a "pretty" view, encourage your colleagues to install STAR on their own machine. If you are receiving a results file exported by STAR, you can import and view the results by using the File Menu as shown:



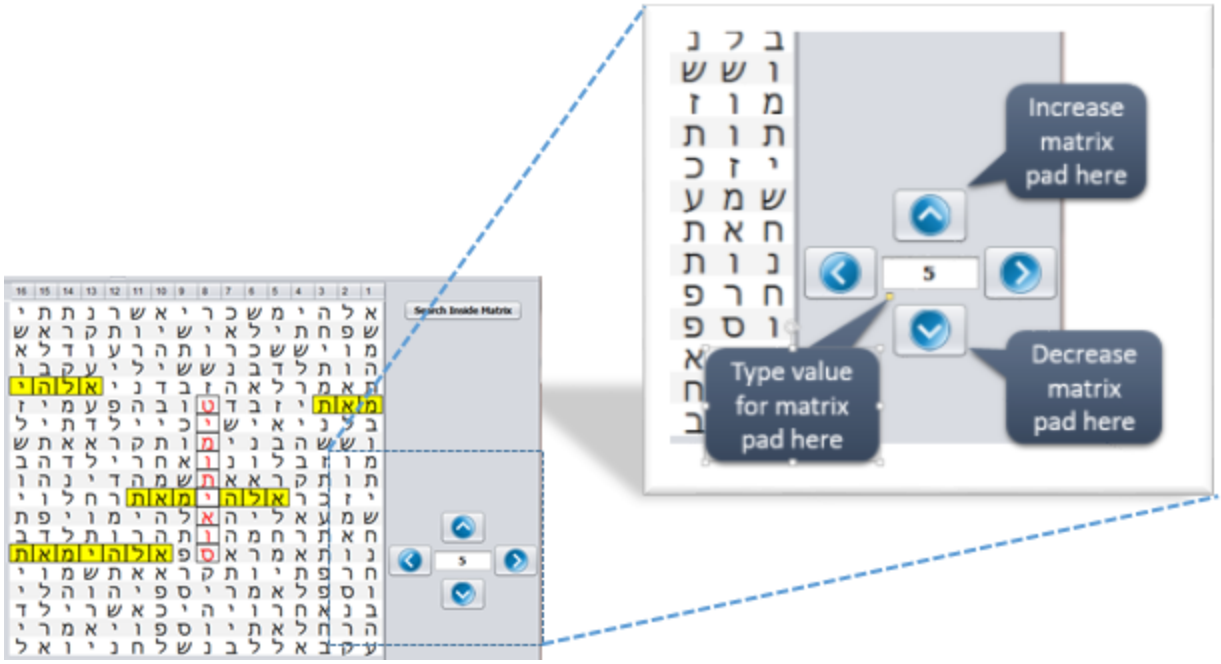
You will be prompted with a similar file chooser dialog that will enable you to select the file and import it. After you import, navigate to the *Results Pane* and inspect the results just as if you had performed the search. You have the ability to perform searches within the matrix just as if you had been the one to perform the original search.

If you also need the query associated with the results, you will need to import that separately (we'll fix this in a future release so that the query used to produce the result is included with the results).

7 Matrix

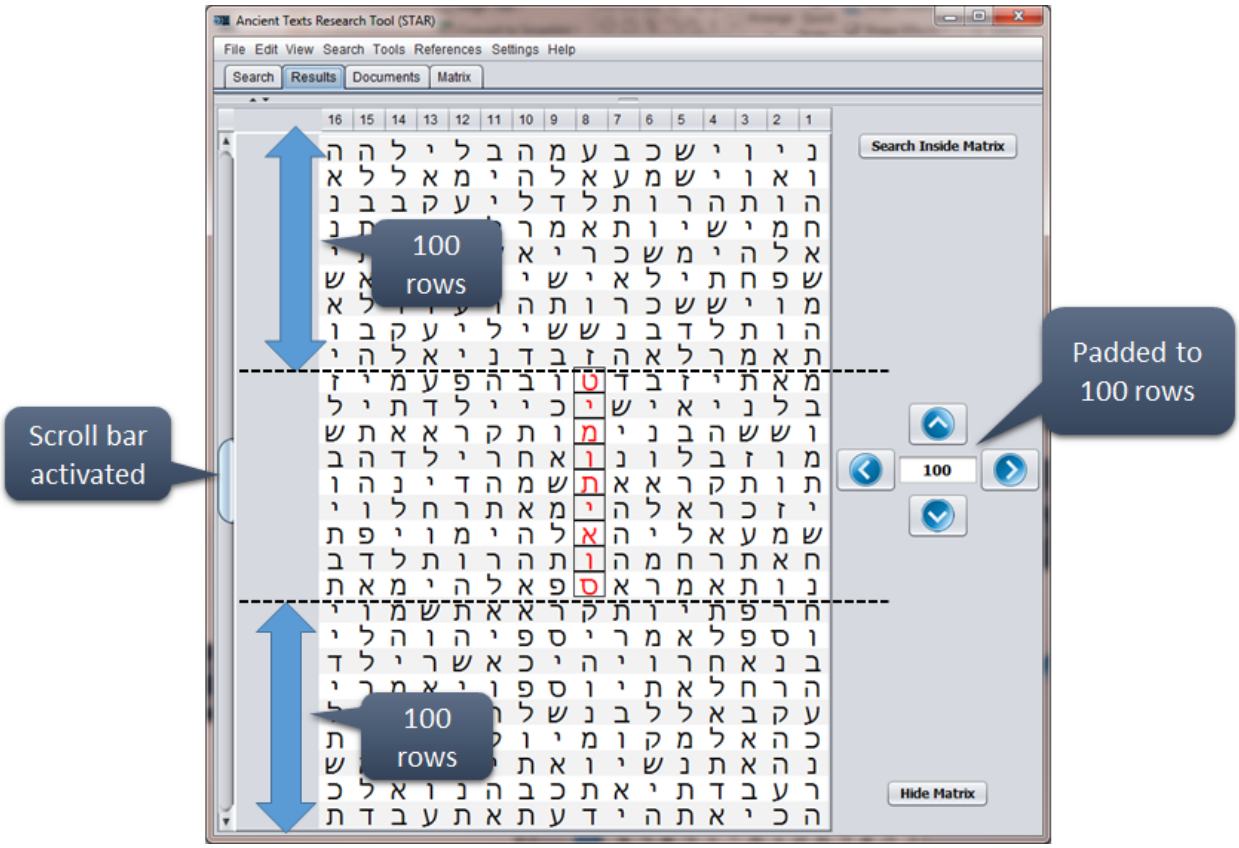
7.1 Increasing the Matrix Pad

Common to both panes that display the matrix, you are provided with controls to increase and decrease the rows that pad any particular selected result.



You can increase the size of the viewable matrix by the up arrow  , and conversely you can decrease your matrix viewing size by selecting the down arrow  .

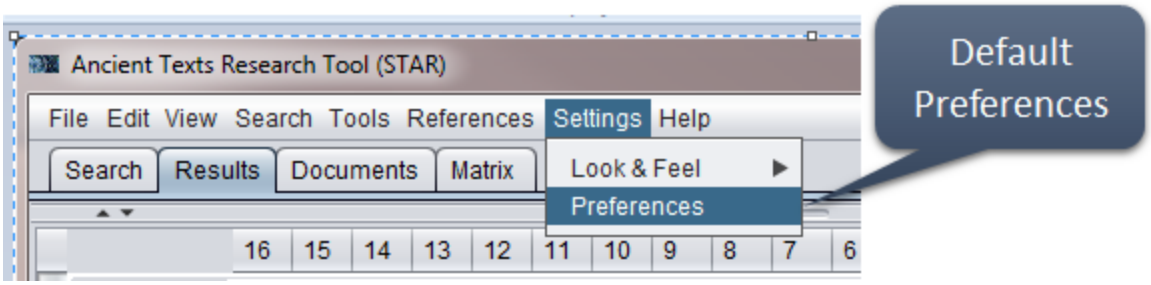
Shown in the snap below is the famous Timotheus search term in its matrix where we have applied a pad of 100 rows. Notice that a pad of 100 rows is applied from the top of the matrix to the start of the search term, and then from the last letter character of the search term to the bottom of the matrix. The scroll bar to the left has been activated to enable you to navigate within the matrix.



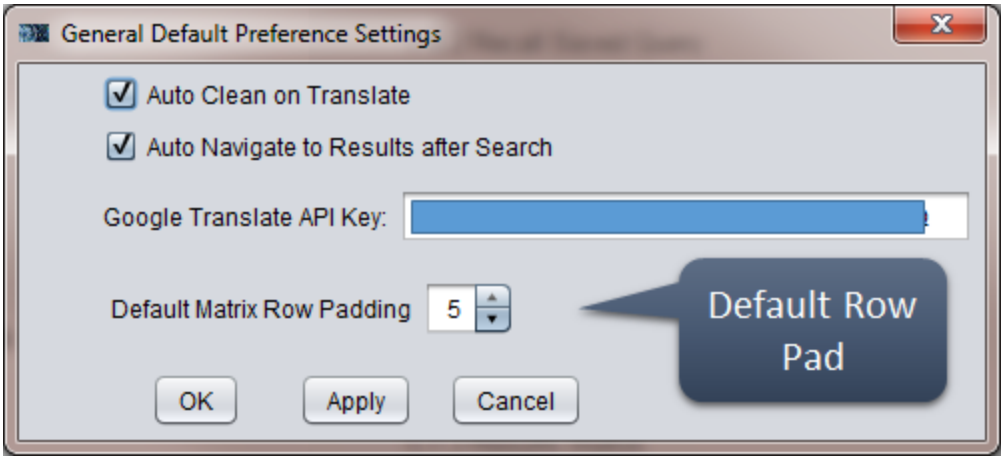
7.2 Retaining Pad Setting within Session

Selecting a different result from the Results Table will still maintain the padding of your previous adjustments.

7.3 Default Padding

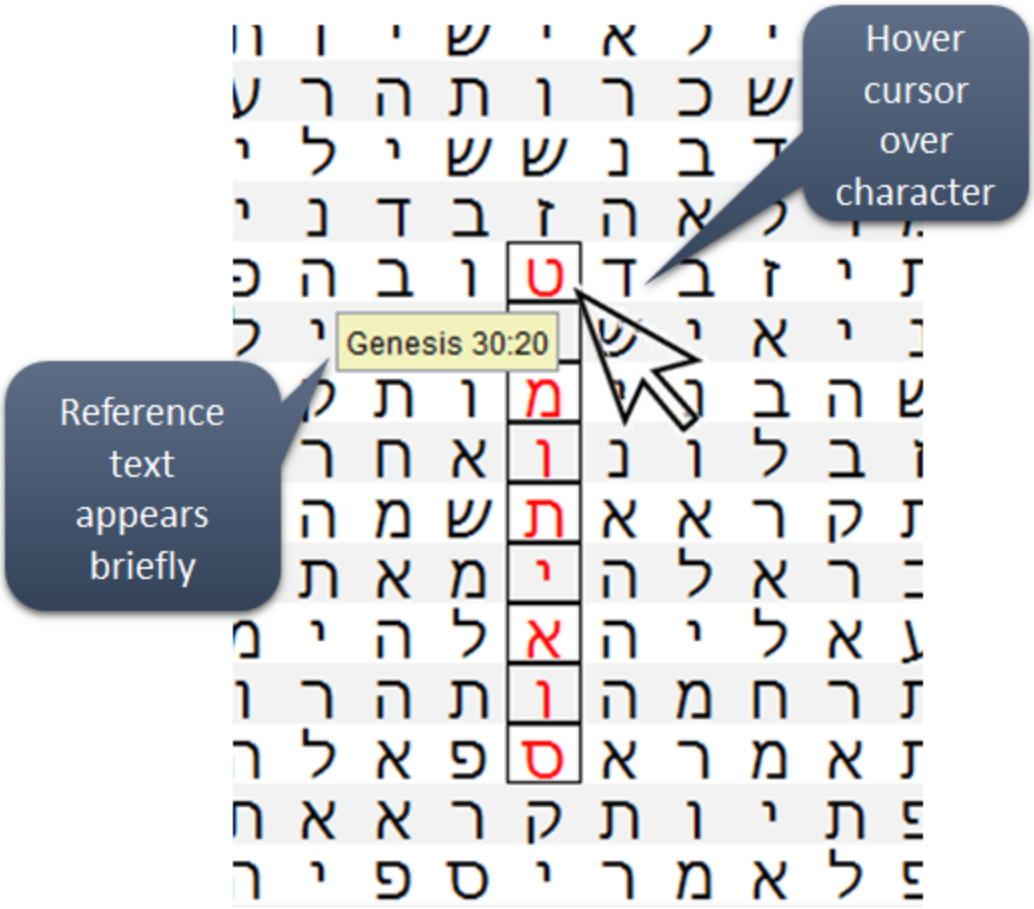


If you want your pad setting to persist between sessions of STAR, you can change the default setting via the Preferences Menu under Settings: Settings ⇒ Preferences. This will launch the *General Default Preference Settings Dialog* which will allow you to set the your desired default row pad.

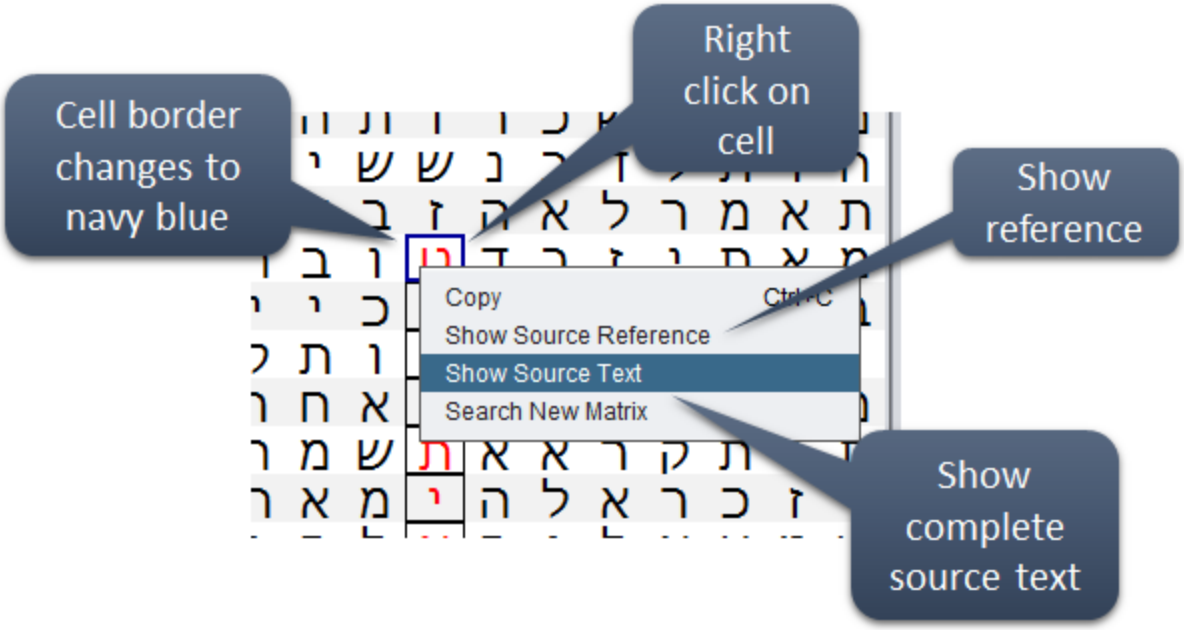


7.4 Text References

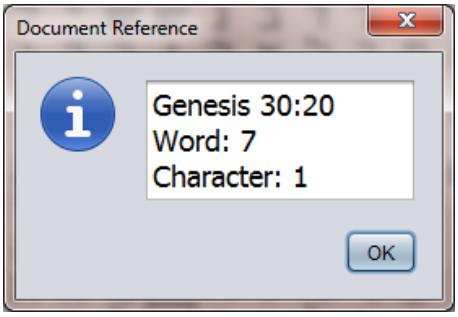
There are several techniques you can employ in STAR to view the underlying text reference and the actual source text underlying your matrix. The quickest way to visualize the document source reference for any character displayed in the matrix is to hover your mouse cursor over a particular letter in the matrix as shown in the snap below. When you do that, the reference will appear for about two seconds.



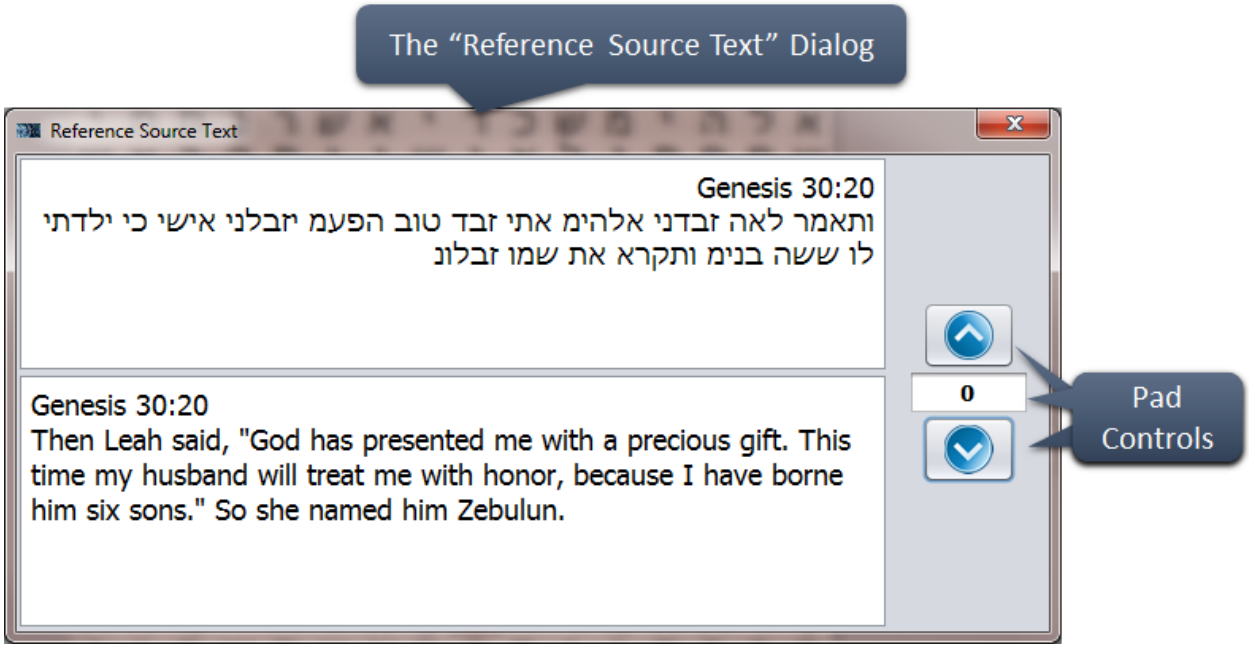
If you want to dive further into that reference, select the cell of the matrix for which you are interested, right click, and several options will become available via the pop-up menu shown below.



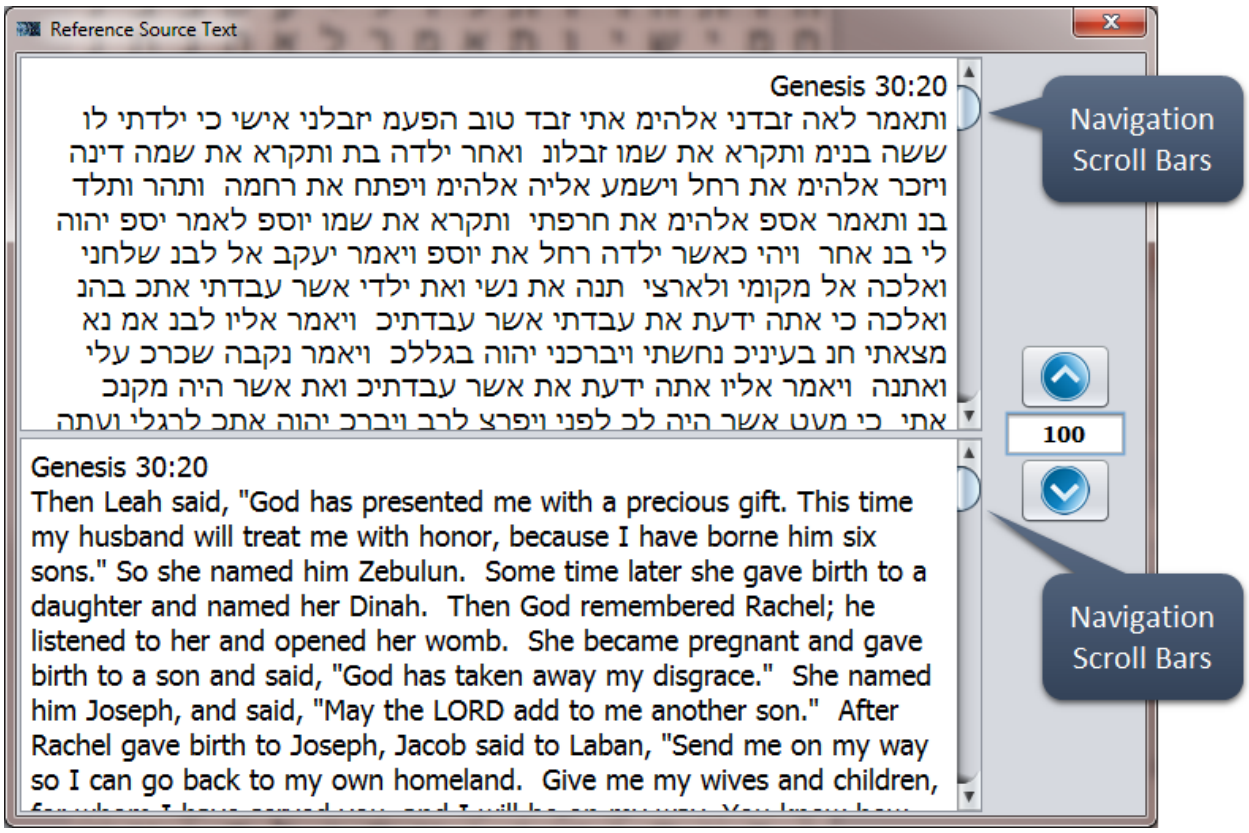
Selecting the “Show Source Reference” option will show the search *Document Reference Dialog*.



Selecting “Show Source Text” will launch the *Reference Source Text Dialog* that displays the entire verse in its paired Hebrew /English equivalents.



You can expand the amount of reference material that is shown in the dialog by using the Pad Control buttons and the input text field. For large pads, navigation scroll bars will appear as shown.



7.5 Search New Matrix

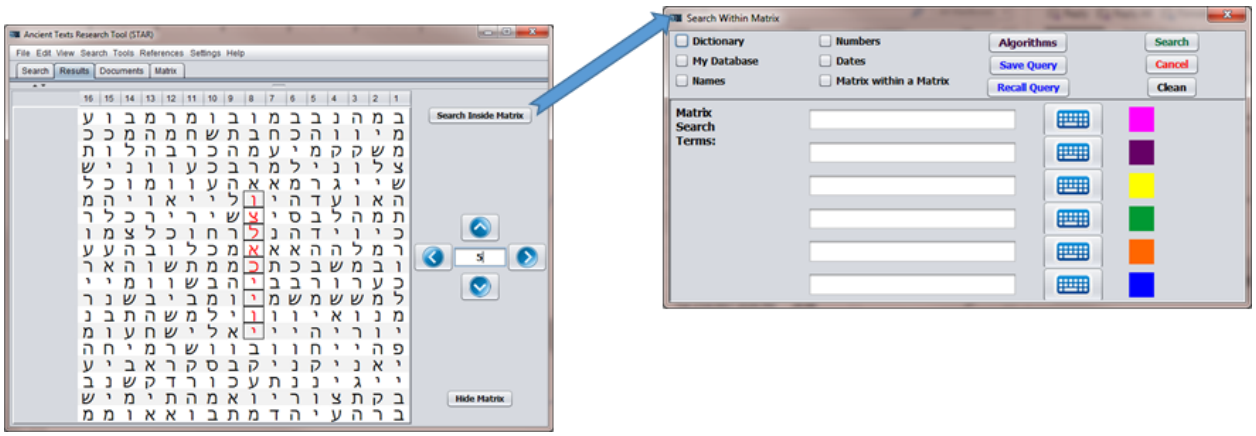
The “Search New Matrix” option that appears in the same right click pop-up window as the reference text selections is an option available in the Pro/Education version of the software that enables you to build a secondary matrix for searching from the letter sequence only in the selected column.

7.6 Searching Within the Matrix

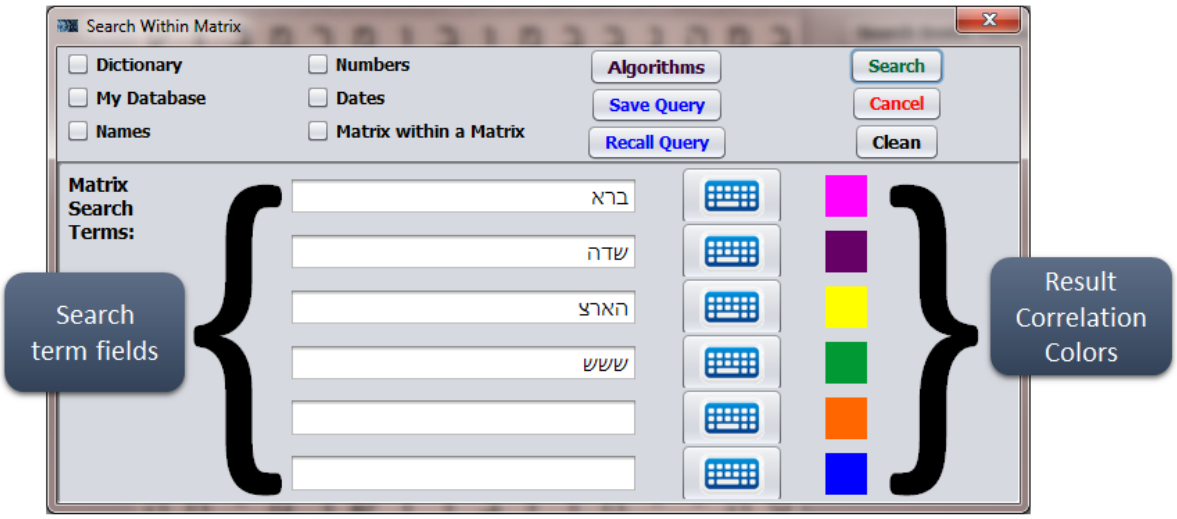
There are two options you can use to perform searches within a matrix. The first option it to do it when you originally perform your primary search. That process is explained in the *Auto-Search Matrix* Section.

The second option, explained here, is to use the 

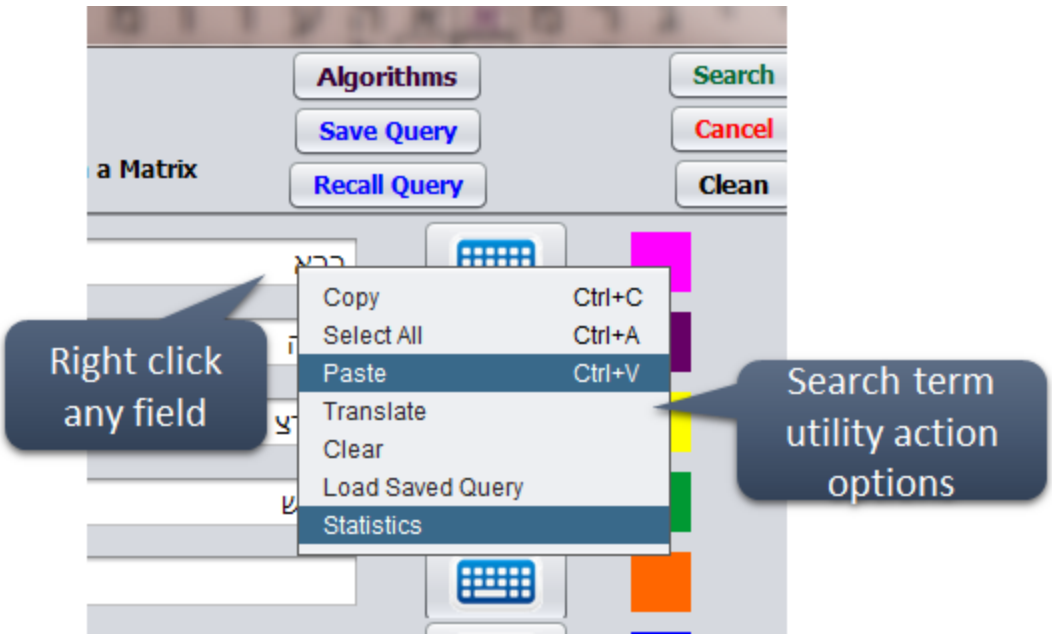
button shown in your matrix view to present the *Search Within Matrix Dialog*, which provides all the controls for refining your search. We’ll walk you through each element of that dialog here.



7.6.1 Matrix Search Terms



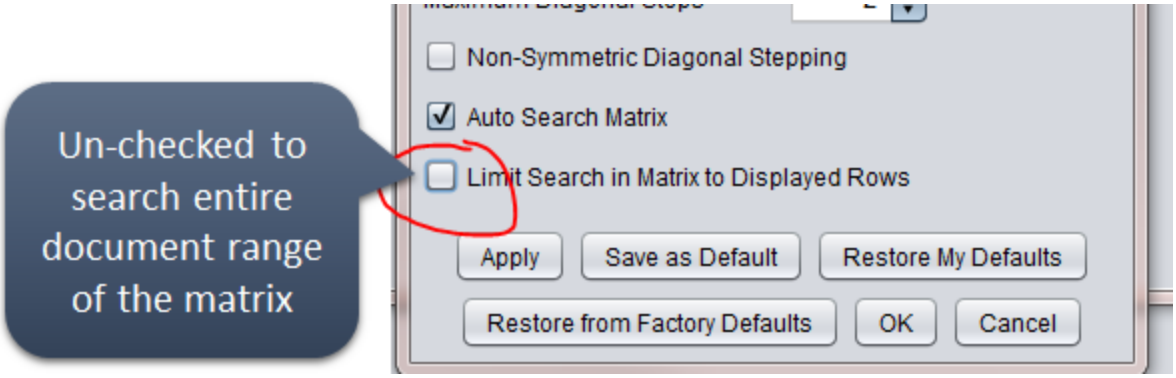
Search terms to be searched within the matrix may be entered in any of the six (6) text fields provided on this dialog. The colored squares indicate the color that will be correlated to the result in both the results table and the matrix that is derived from the search term. You can use the Hebrew Keyboard icon  next to each input text field to provide Hebrew text, or simply copy and paste from an external source. Right clicking on any of the search term fields will provide the standard set of search term utility action options.



7.6.2 Search Algorithms

Selecting the Algorithms button 

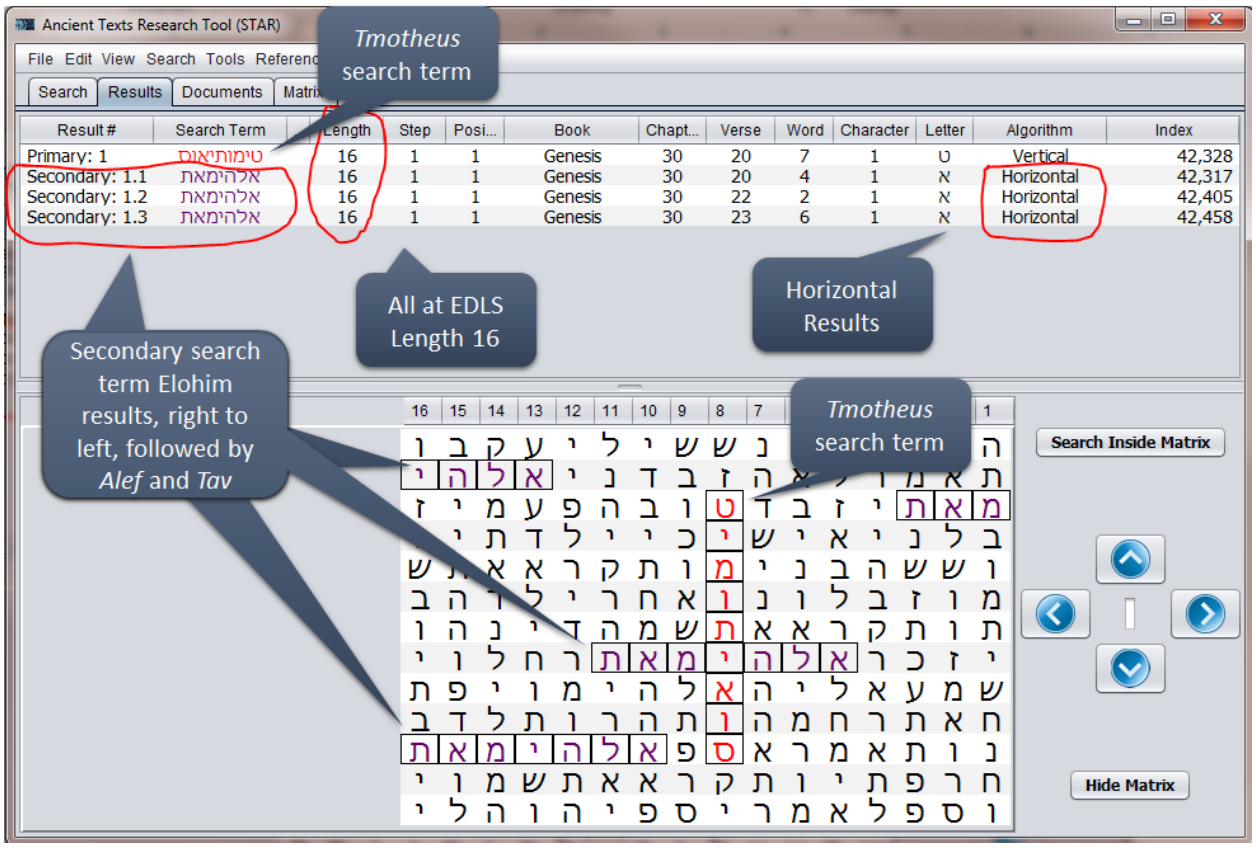
from this dialog launches the *Search Algorithms Settings Dialog*, whose functions have been previously explained in Primary Search. One extremely important feature of this dialog that greatly affects the results you will find within a matrix is the "Limit Search in Matrix to Displayed Rows" checkbox. By default, this option is set to selected so that searches will be constrained to your visible matrix (which includes your selected results and all padded rows). If you don't find any results within your matrix for a particular search term, you may want to un-select this check box. This will broaden your search range to that of document control range, the range you used for searching primary results.



7.6.3 Horizontal Search Within a Matrix

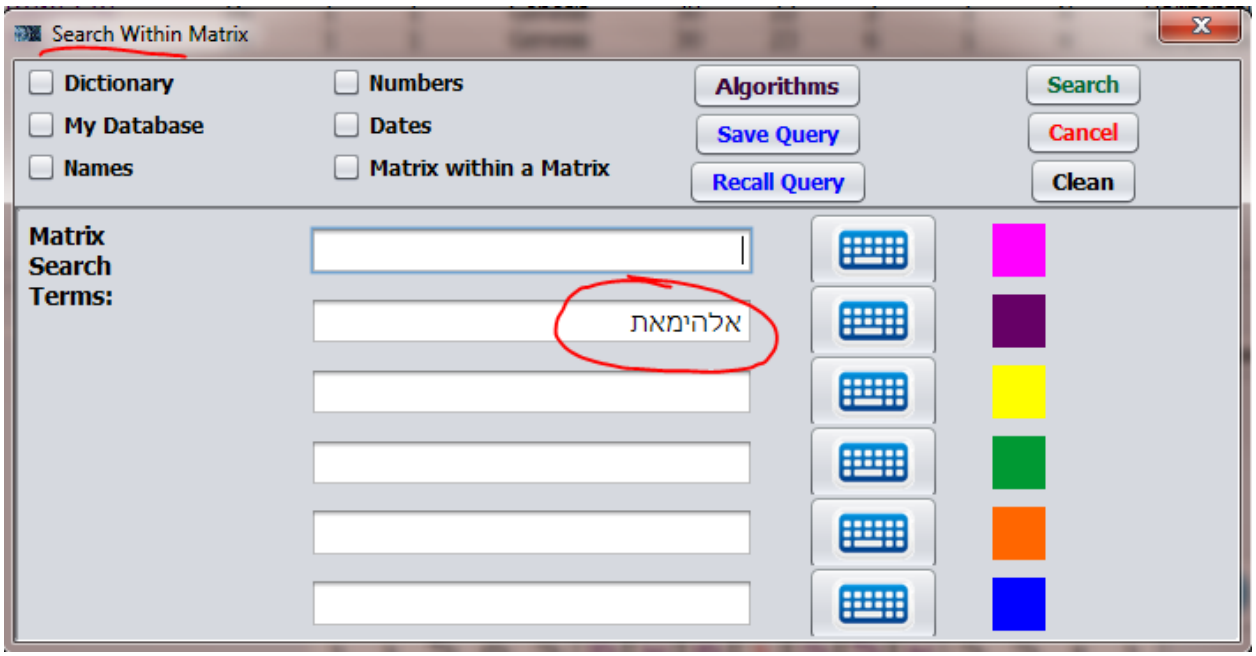
Since a "Horizontal Search" only applies to searching within a matrix, its settings and results are described here. The need for this capability came about via our efforts to reproduce results from the CK where the author shows horizontal results crisscrossing a vertical results. We'll use an example directly from the book to explain this feature.

The following snap below shows results found via a search within the matrix that was already generated via the vertical Timotheus search term at length 16.

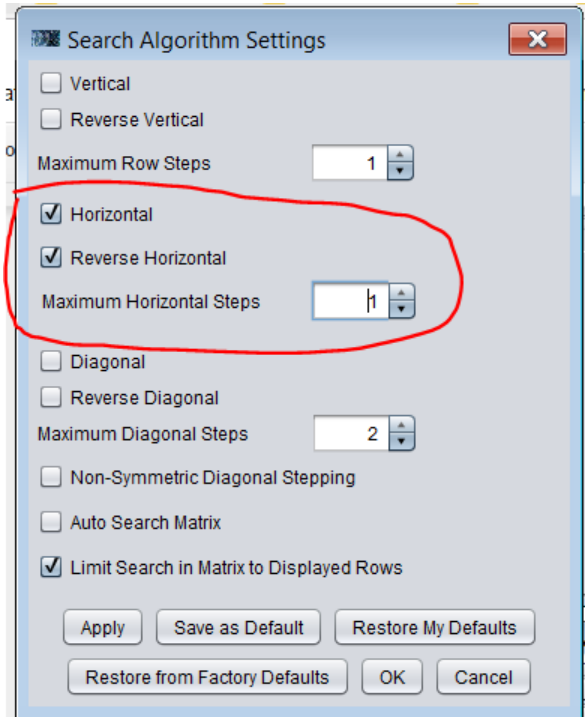


The results were achieved by performing the Search Inside Matrix function

, using אלהימאת (Elohim followed by Alef and Tav) as matrix search term as shown in the snap below.



The Horizontal algorithm settings used for that result group are as shown to the right.

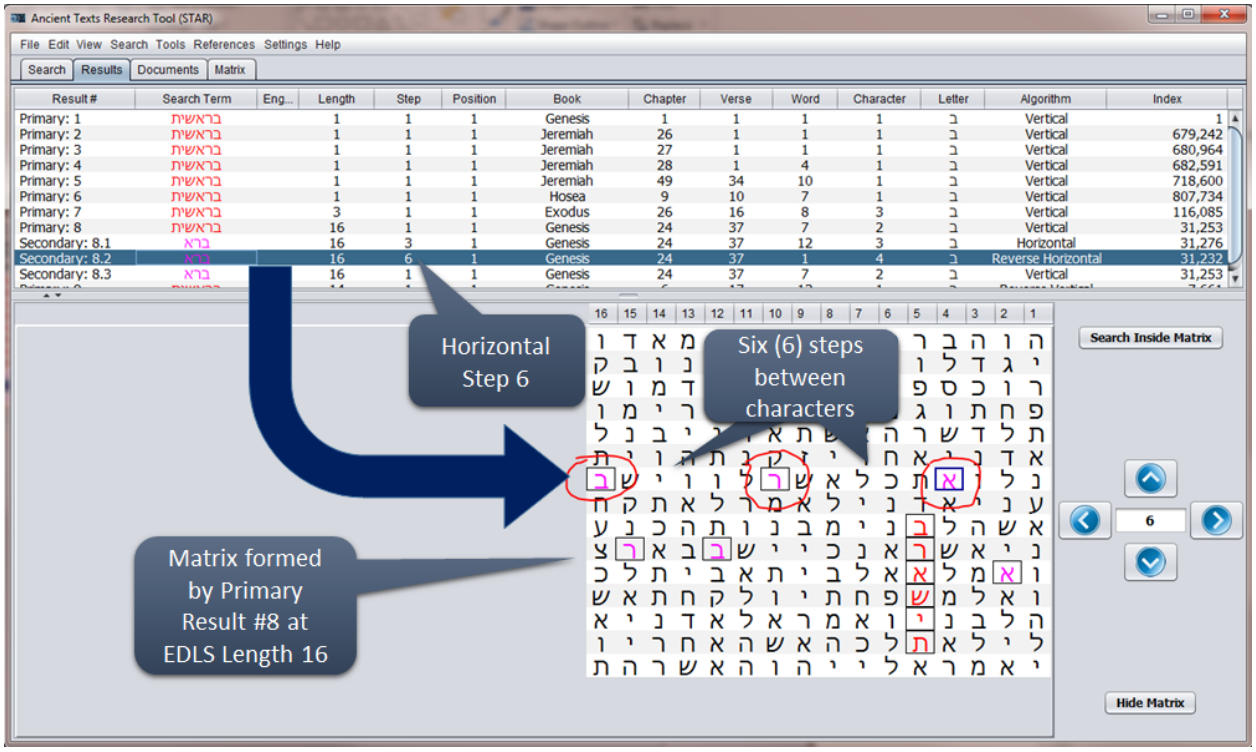


Maximum Horizontal Steps

By using the *Maximum Horizontal Steps Spinner* on the dialog, you can perform searches for skips within the search term that will show up either forward horizontal or reverse horizontal at skip lengths of the search term. A maximum setting of one (1) will produce only results where the letters are ordered exactly as they are in the overt text.

By setting this value to a number greater than one (1), the algorithm searches for all results of the matrix search term at each of those possible horizontal steps beginning at one (1) and inclusive of the maximum step setting.

An example of a horizontal step result found by having set the spinner to a value of six (6) while searching within the matrix where a primary result was found at length 16 for primary search term בראשית. The snap below shows that the secondary matrix term ברא was found at the same EDLS length of 16 at a horizontal step of 6.



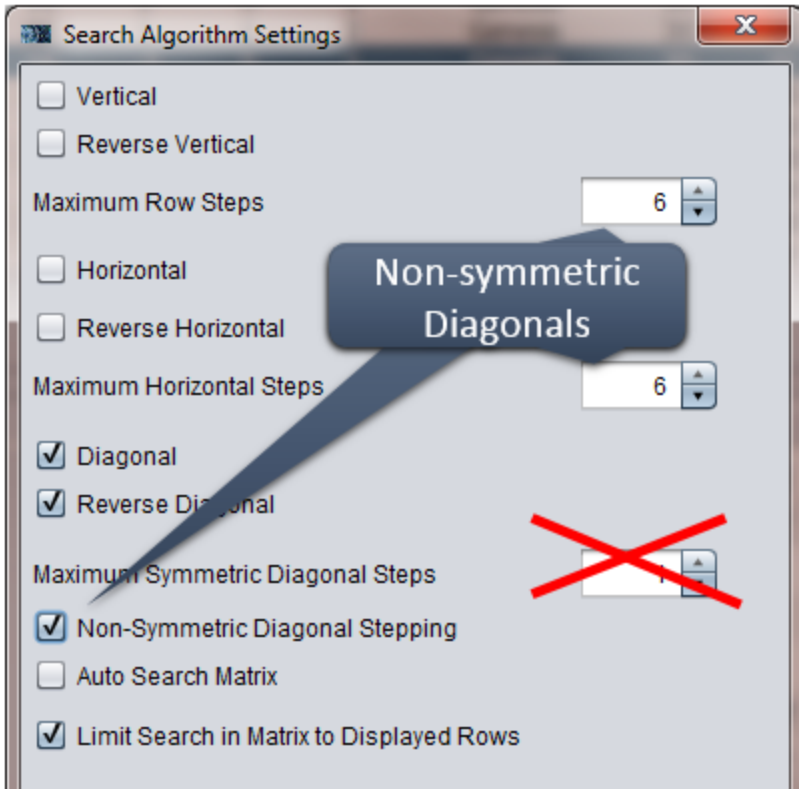
7.6.4 Symmetric Diagonal Search within a Matrix

Performing a symmetric diagonal search of secondary within a matrix is very similar to the discussion above with regards to horizontal searching. While searching within the matrix for symmetric diagonals, the maximum steps will be governed by the values you have set using the ***Maximum Symmetric Diagonal Steps Spinner.***

Secondary results will be formed (where they exist) where the Row Step exactly equals the Column Step.

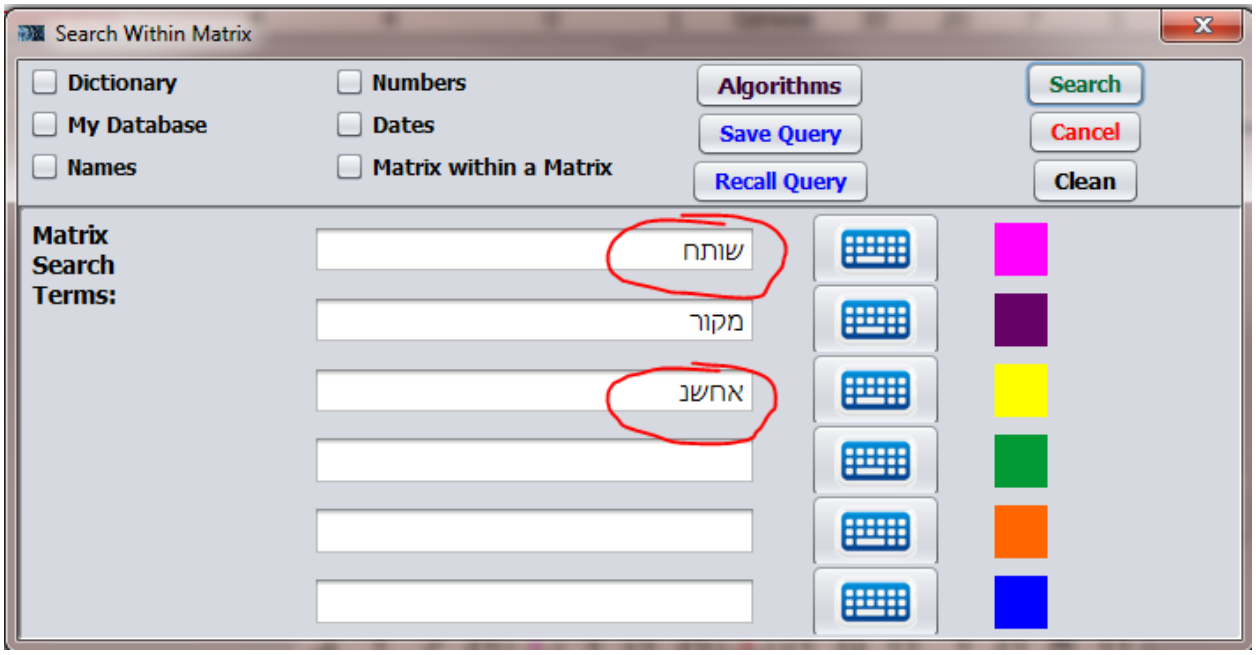
7.6.5 Non-Symmetric Diagonal Search within a Matrix

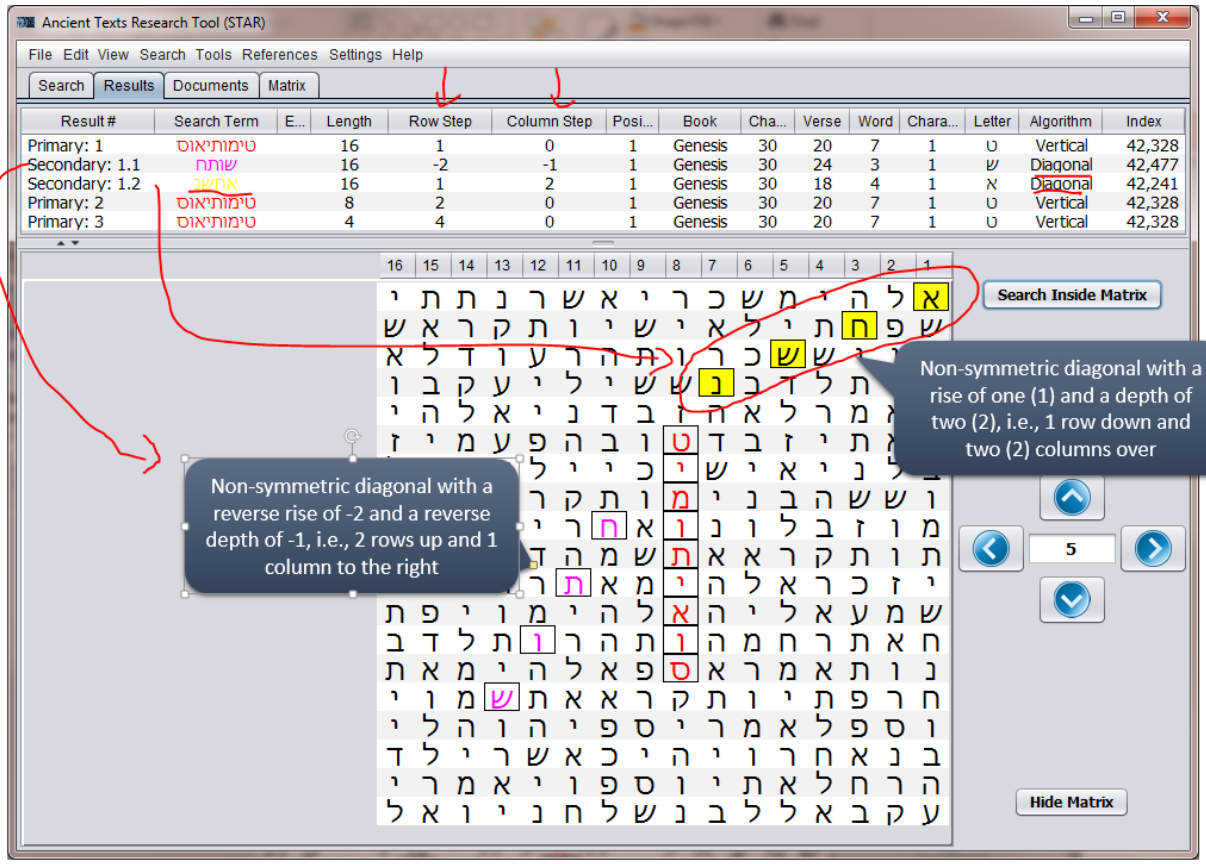
While searching for non-symmetric diagonals within the matrix, the maximum steps will be governed by the values you have set in the *Maximum Row Steps Spinner* and the *Maximum Horizontal Steps Spinner* as shown below.



For non-symmetric stepping, results can be deciphered by the "Row Step" and the "Column Step" columns of the secondary results.

The snap below shows an example of where secondary search terms were queried in the matrix of length created by the "*Timotheous*" key. Two of these terms were located in the resulting matrix (limited by what was displayed in the view).

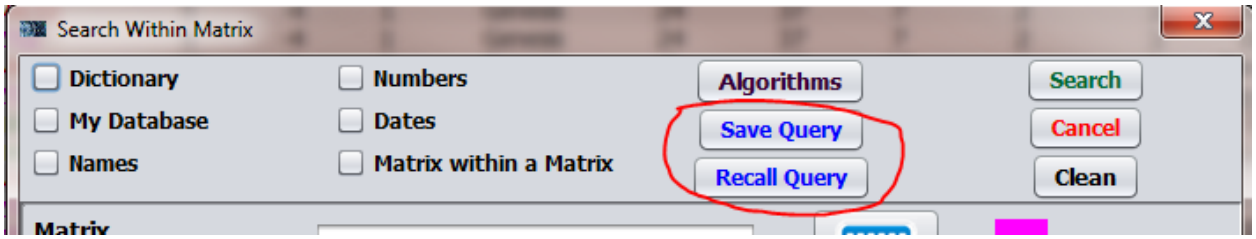




You can verify the results by climbing (or descending) the staircases governed by the "Row Step" and "Column Step" of each result. For the Secondary 1:2 result in the snap shown in the yellow highlighting (**אחשנ**), you can walk through the result with your finger. Beginning with the first Hebrew letter **א**, navigate one row down, and two columns to the left to arrive at the second letter of your search term (**ח**). Always remember, Hebrew reads from right to left, so navigating to the left in a diagonal result is represented by a positive column step. If you continue that stepping process, you will eventually arrive at the last letter of your search term (**נ**).

Secondary 1:1 result in the snap, created from the search term (**שותח**), provides an example of reverse diagonal, i.e., the diagonal traverses upward. Here again, you can step through the result beginning with the first letter of the search term **ש** and navigate two rows up (governed by the -2 row step) and one column to the right (governed by the -1 column step). You will then arrive at the second letter of the search term (**ו**). The stepping pattern continues to the end of the search term **ח**.

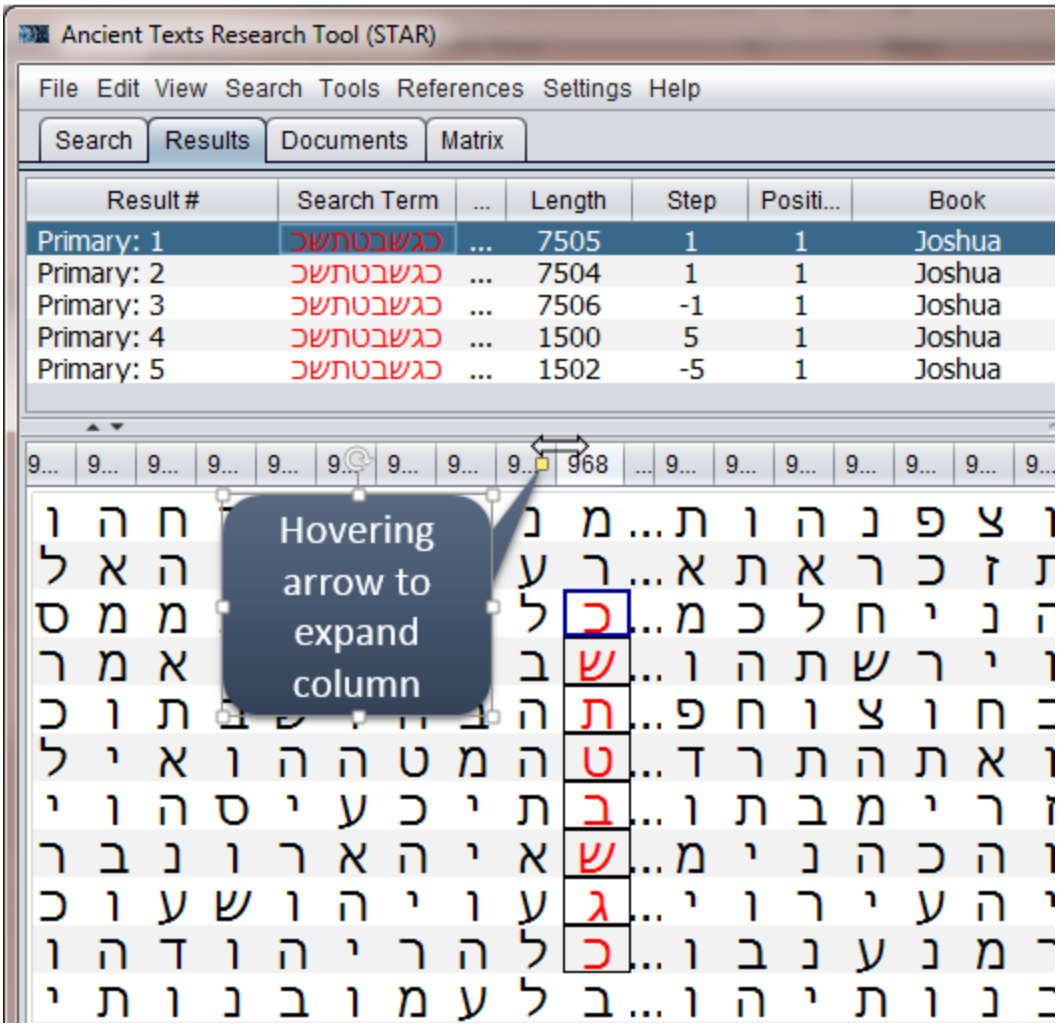
7.6.6 Save Query and Recall Query



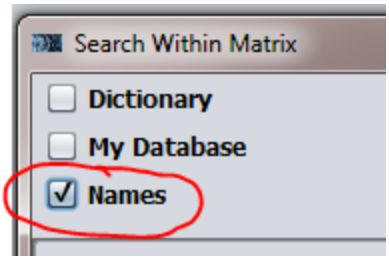
The *Save Quer*y and *Recall Query* buttons provideD in the *Search Within Matrix Dialog* provide the exact same functionality that you will find on the *Primary Search Pane*. They are duplicated here as convenience if you need to either save new search terms you've entered into the search terms fields, or want to recall a previously saved query that contains matrix search terms you'd like to user here. Details of using those functions are found here.

7.6.7 Viewing Column Numbers

For matrix results that span over 100 columns (e.g., the CK birthdate query), you will need to expand columns by hand to view the column number. You can do this with your mouse as shown in the snap by selecting and grabbing the column edge and dragging. This performs like any other modern software tool that is used for displaying and manipulating grids/tables (e.g., Excel).

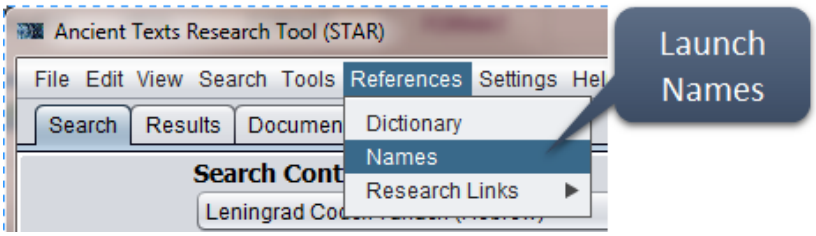


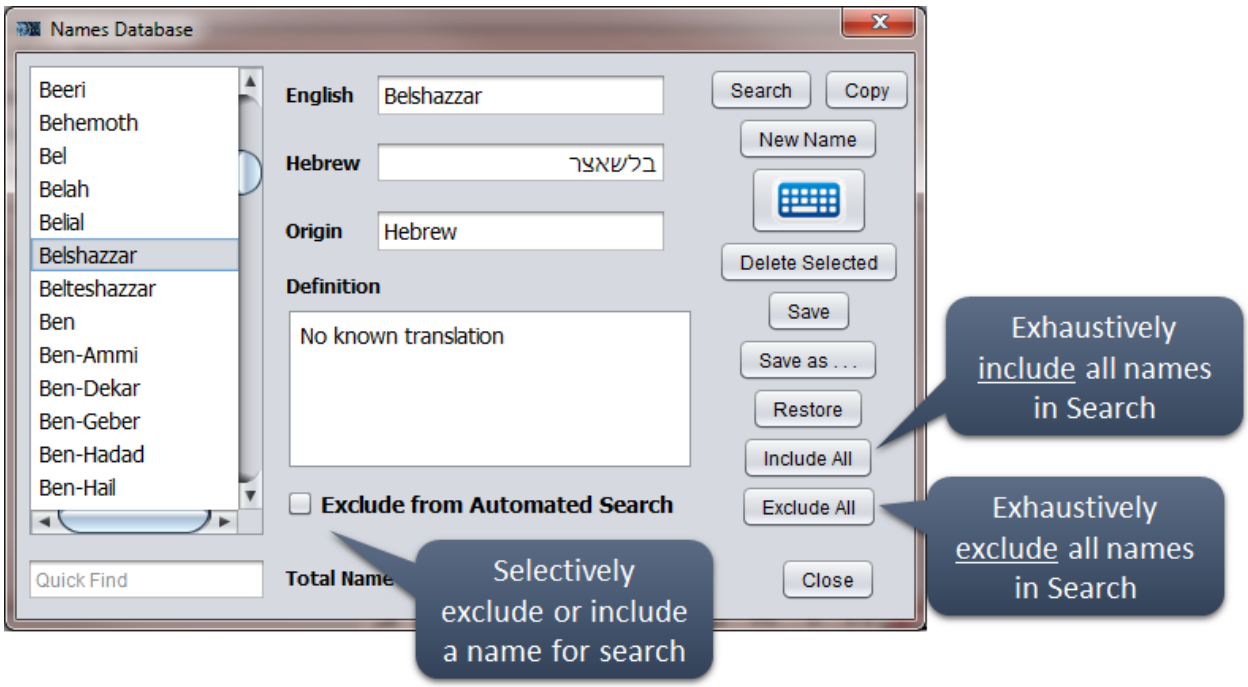
7.6.8 Searching Names Within the Matrix



STAR provides the means for you to perform searches of names from the Names Database in your matrix. You have the ability to perform exhaustive searches of every name in the database, or just a few names you select. To activate the option, select the Names Checkbox found on your Search Within Matrix Dialog as shown (before selecting Search 

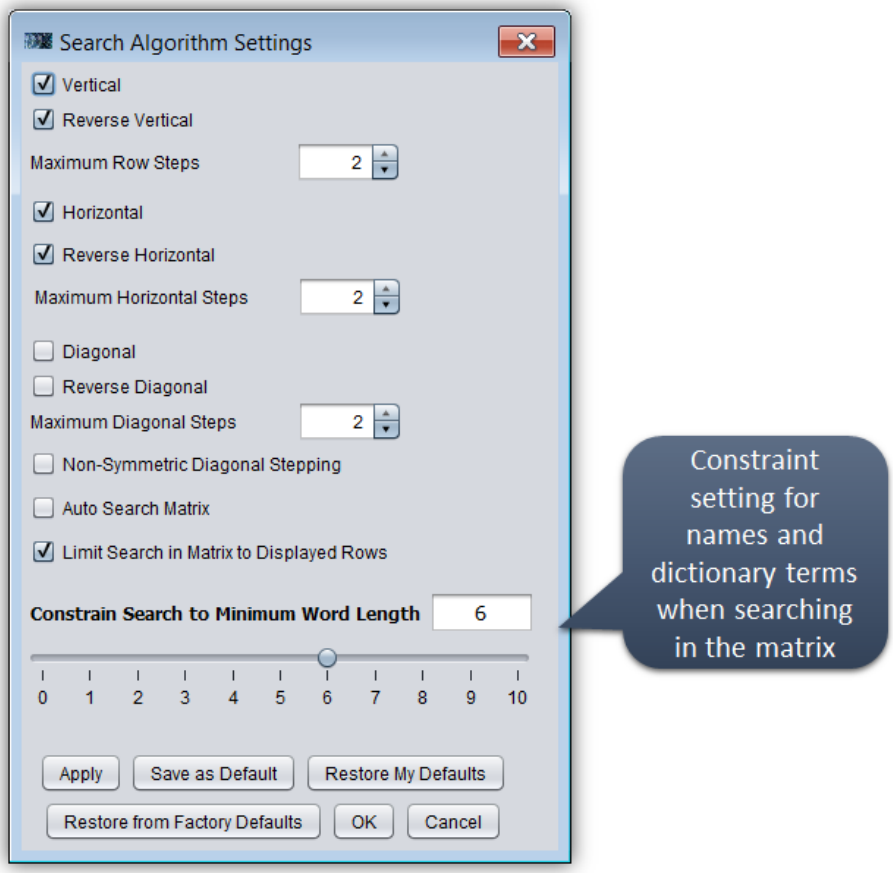
). The algorithm will treat names from the database as individual matrix search terms. To prescribe which names are used, you need to launch the Names Database Dialog. The quickest way to do that while in the Results Pain is to access the database via the Main Menu as shown.



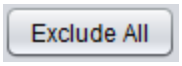


Details of each of the controls on the the Names Dialog are explained in the Names Section of this document, but the critical specifics of searching within matrix using names are provided here. The snap above provides call outs to the three controls you must employ to utilize search with names. The *Include All* button, if selected, will modify every Name record to be enabled for Search. This can be dangerous if you are searching a very large matrix against the over 3,500 names in the database. You may be waiting a very long time for the search to complete. There is also very little relevance to search names with very few letters because you will get thousands upon thousands of results with just one name.

The *Search Algorithm Settings* provides the first order of filtering of names via a minimum word length setting. The *Constrain Search to Minimum Word Length* setting applies to name, date, and dictionary searches. By using this control, you can limit searches to those that are truly relevant, i.e., those names with considerable length.

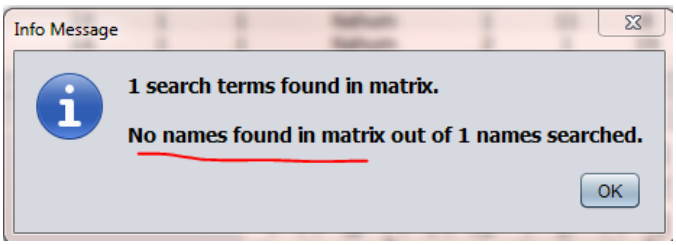


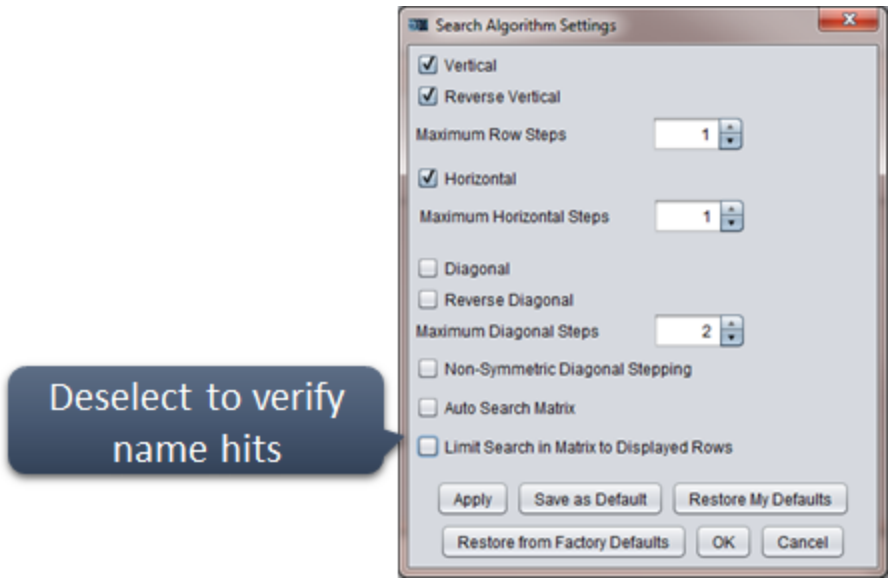
A secondary approach to filtering is to selectively choose only names that you want to search.

You do this by first de-selecting all names from search via the Exclude All Button 

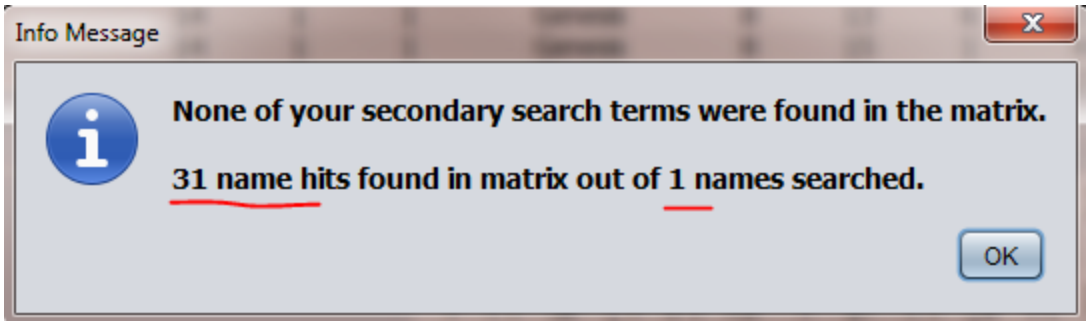
on the *Names Database Dialog*. Once selected, you will see that all Name records show that the *Exclude from Automated Search Checkbox* have been deselected. Once that is performed, selectively go through the names for which you want to search and enable them via the *Exclude from Automated Search Checkbox (*deselect action*).*

If, when initially searching, you do not detect any name hits, open up your search by using Search Algorithm Settings. In this example below you can see that on initial search of one particular name (e.g., Belial), no names were found. By then de-selecting the "Limit Search in Matrix to Displayed Rows" check box, many results of the name were found on the subsequent search.

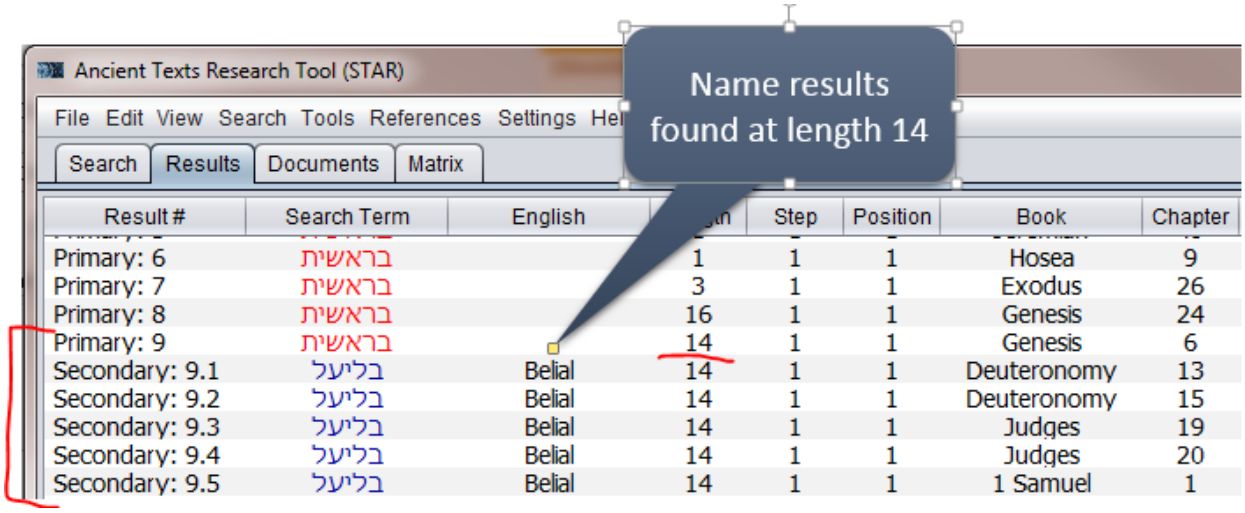




In our example, after making the change, we then received 31 name hits out of the one name searched, which gives us full confirmation that the search is working, but not finding the name in the bounded matrix.



An example of how these name hits are displayed in the Results Table are shown below where both the Hebrew and the English components of the name are shown.



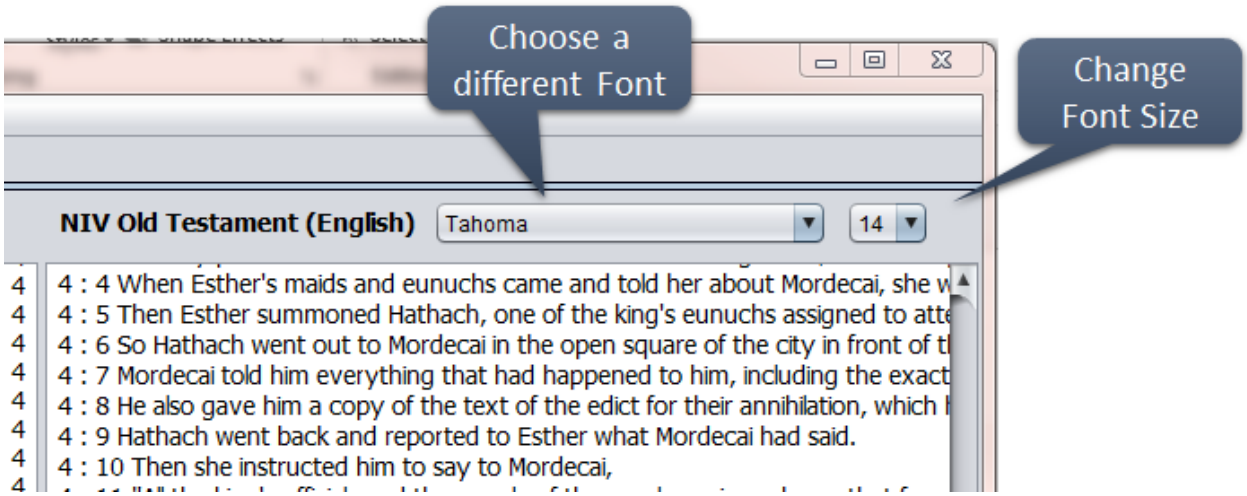
Result #	Search Term	English	Step	Position	Book	Chapter
Primary: 6	בראשית		1	1	1	Hosea	9
Primary: 7	בראשית		3	1	1	Exodus	26
Primary: 8	בראשית		16	1	1	Genesis	24
Primary: 9	בראשית		14	1	1	Genesis	6
Secondary: 9.1	בליעל	Belial	14	1	1	Deuteronomy	13
Secondary: 9.2	בליעל	Belial	14	1	1	Deuteronomy	15
Secondary: 9.3	בליעל	Belial	14	1	1	Judges	19
Secondary: 9.4	בליעל	Belial	14	1	1	Judges	20
Secondary: 9.5	בליעל	Belial	14	1	1	1 Samuel	1

8 Documents Pane

Although the key features of the *Documents Pane* have been described in the Quick Start Section of this guide, there are a few other very handy features of the pane that you should be made aware.

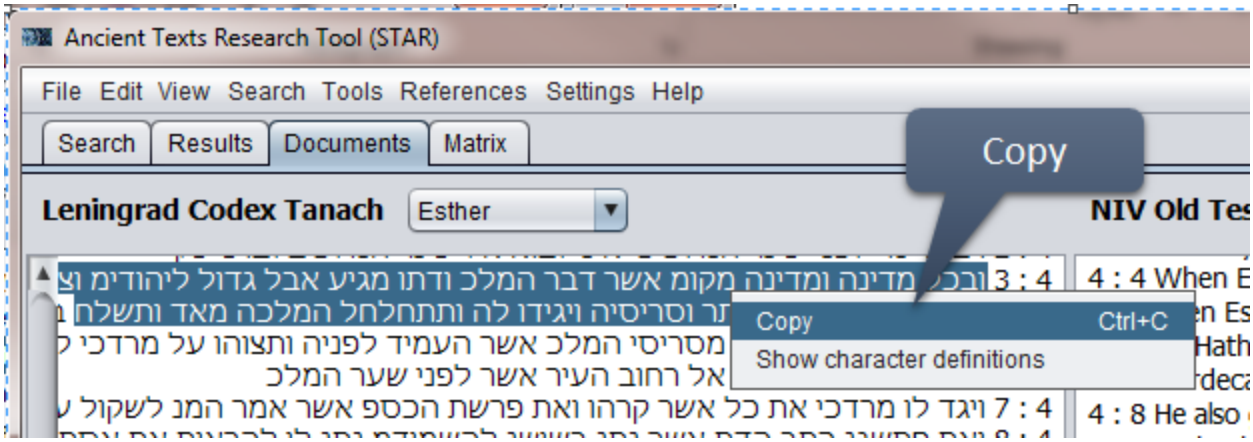
8.1 Font Selection

Shown in the upper left portion of the *Documents Pane* are controls for changing the Font type and the size. This can be extremely useful when inspecting the underlying Hebrew text and for instances when you may want to take screen snaps of text and share with research colleagues. Although we have selected Tahoma as our default font for the pane, we are open to recommendations if you find a font that provides a more readable display of the Hebrew text. We can easily make that font the default for future releases of STAR.



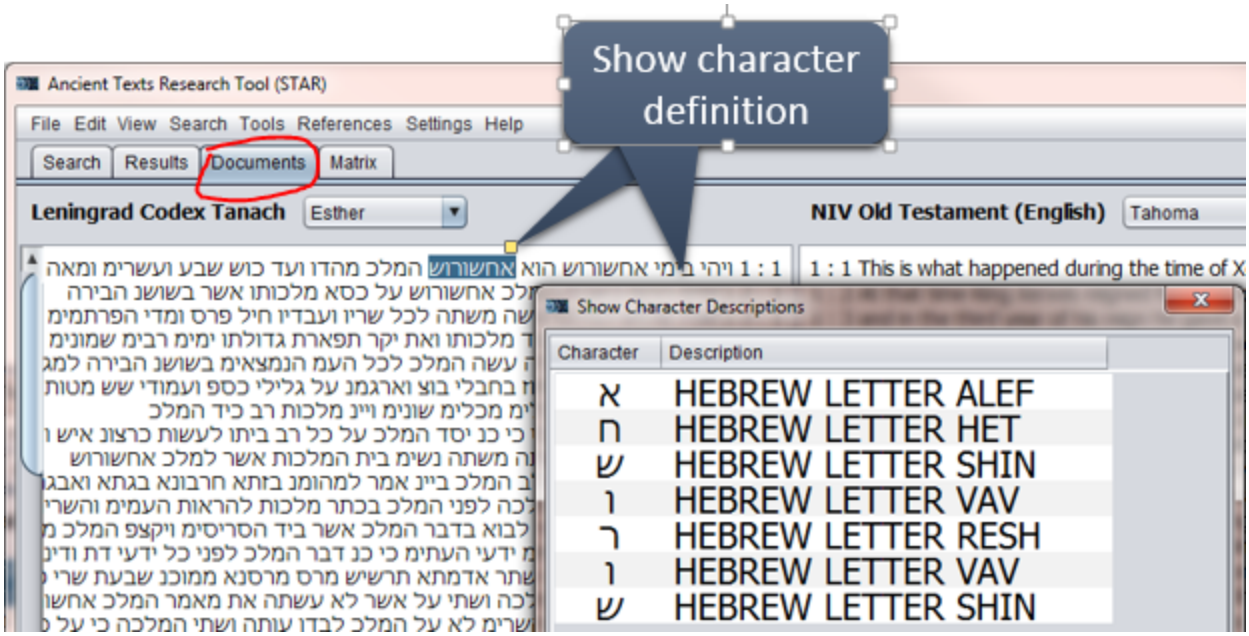
8.2 Copy

As previously mentioned in this guide, always test your *mouse-right-click* in all fields of the GUI … you just never know what you may find. We actually discovered that while writing this manual that a handy *mouse-right-click* popup is also provided in the *Documents Pane*. As shown in the snap below, a right-click popup menu appears that provides the ability for you to copy any of the selected text to your in memory clipboard. You can then paste the text into another document, email, etc. You will also find that wherever we have provided Copy/Paste functions in STAR via these popup menus, the accelerator keys designated by "Ctrl+C" and "Ctrl+V" (for paste) will also work.



8.3 Show Character Definitions

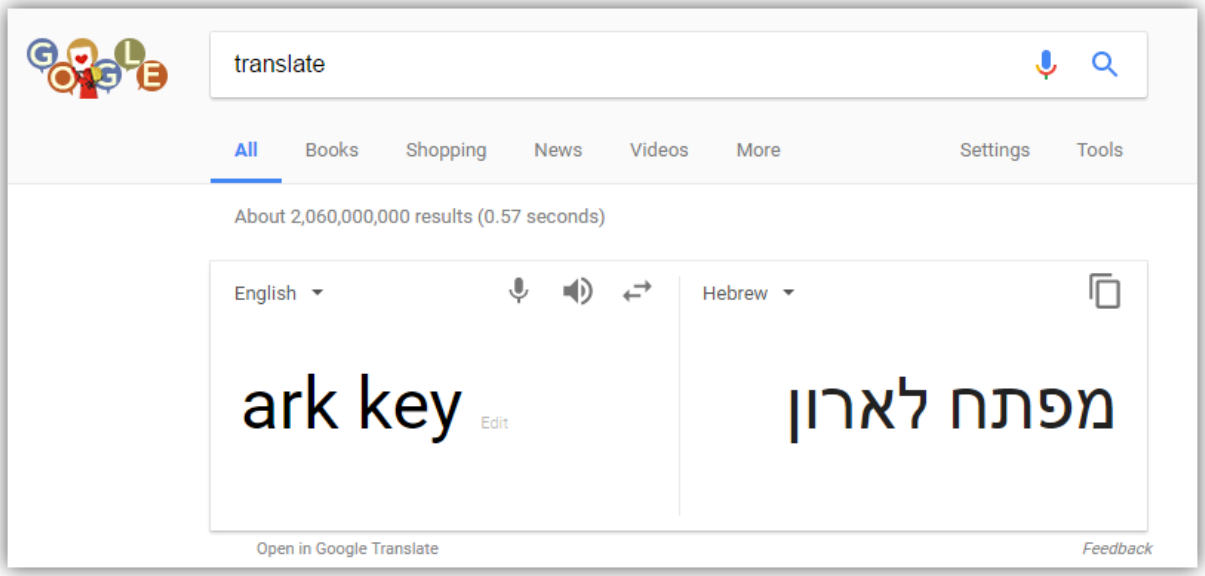
The *Show Character Descriptions Dialog* is also available on this mouse-right-click popup menu. It works both on the Hebrew side of the *Documents Pane* and on the English side. This is a great tool for newbies seeking to learn Hebrew who need a little help distinguishing the differences between the Hebrew characters .



9 Translate

STAR provides an on-board translate feature that harnesses the power of one of the best tools in the industry, i.e., Google Translate. Via numerous right click mouse pop ups, buttons, and menu controls, you have the ability to translate terms between any language. Although you can utilize this exact same service from any web browser via the following link: https://translate.google.com/ , STAR provides an extra level of convenience and efficiency by

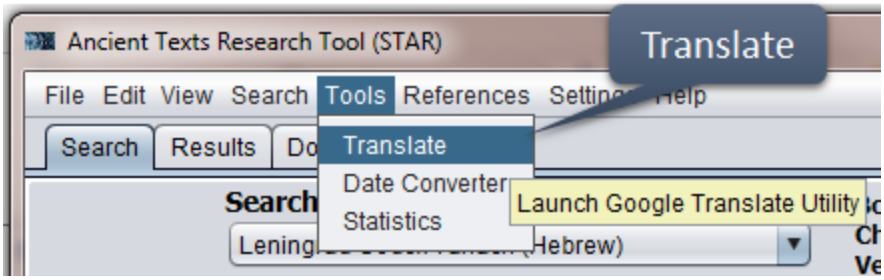
allowing you to translate terms already typed into the GUI without needing to copy and paste from your browser.



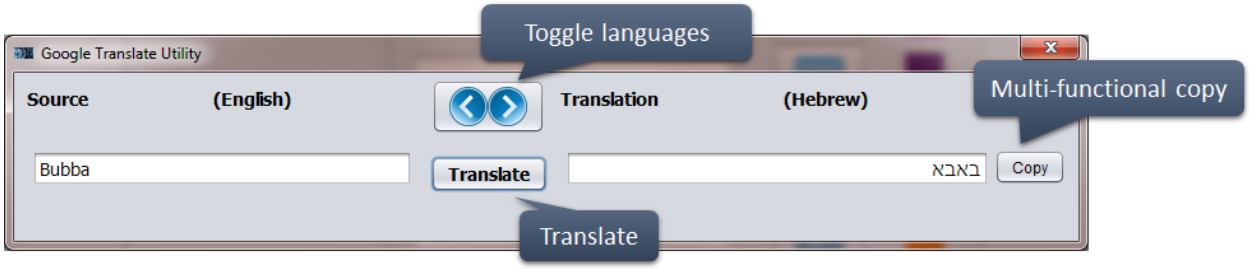
For this capability to work, STAR relies on an open internet connection to talk directly with Google to perform a translation. It utilizes what is known as an Application Programmer Interface (API), which simply means the STAR App can talk to the Google server in an intelligent way.

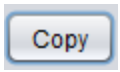
9.1 Main Menu

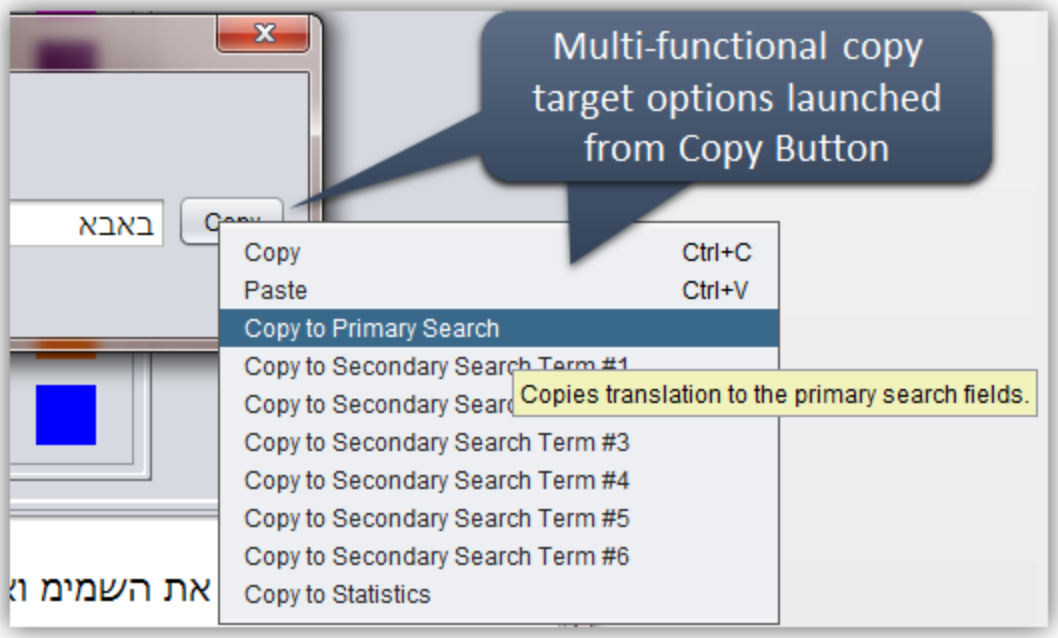
The surest way to find Translate is from the Main Menu as shown in the snap below.



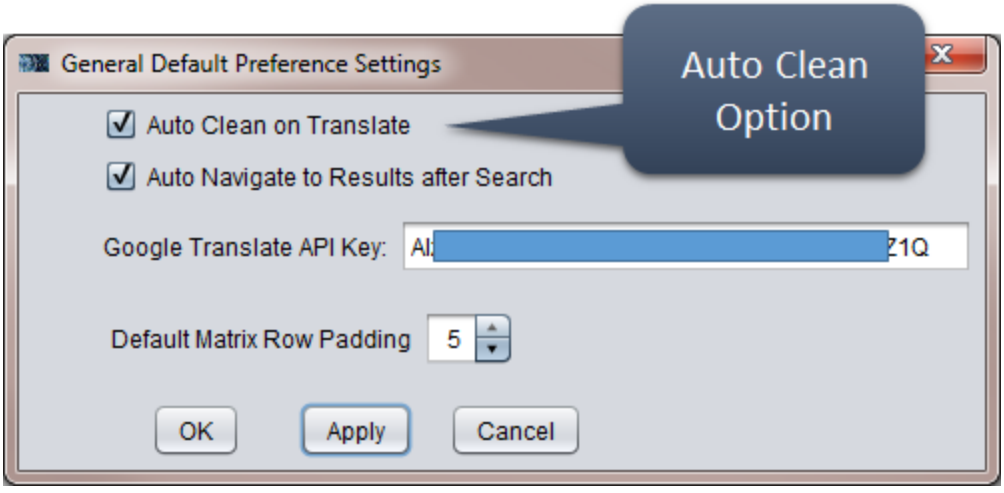
Once selected, the Google Translate Utility Dialog will appear as shown.



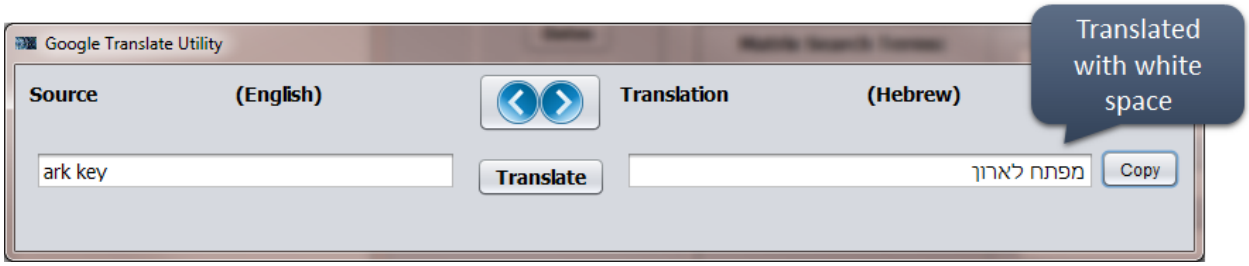
The utility allows you to translate from either English to Hebrew, or Hebrew to English. Use the toggle button as shown  to switch between the two. The Copy Button  on the dialog is multifunctional in that it provides many targets for you to copy translated terms.

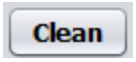


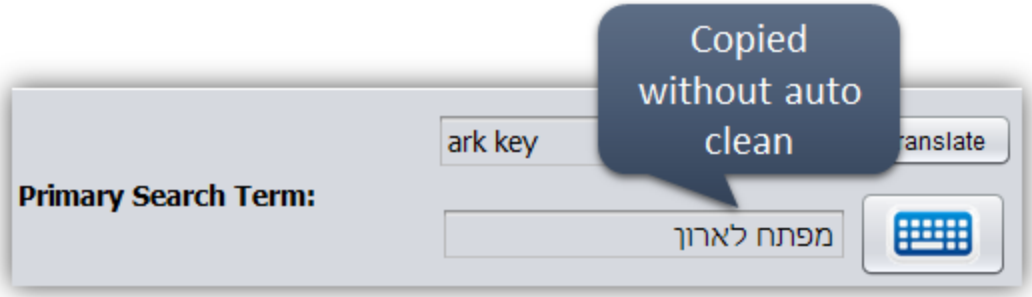
When you copy a term from the Translate Utility Dialog, it will be cleaned of white spaces and normalized to the 22 Hebrew consonants only if your default preference settings for Auto Clean are selected.

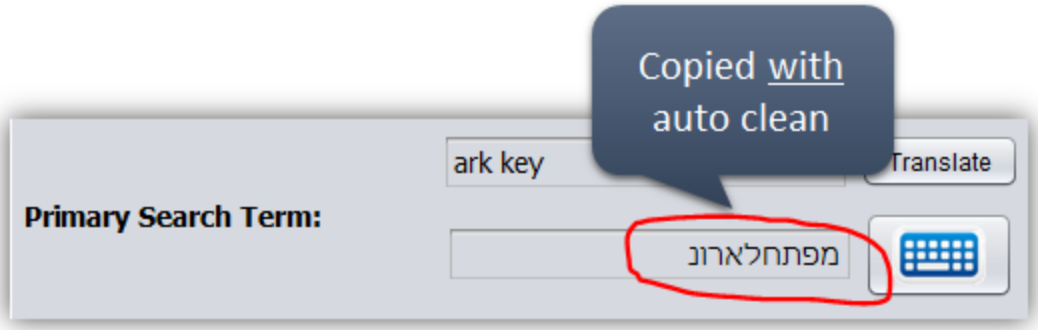


The following example shows a translation of the term “ark key” where the translation has a white space.



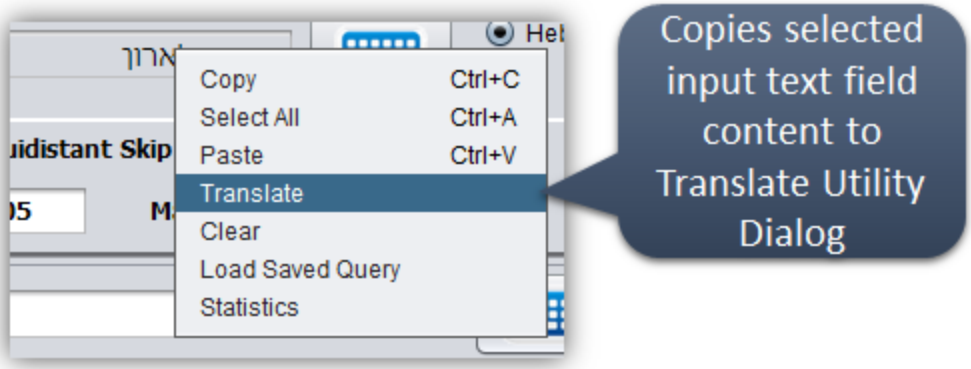
Without the autoclean option set, the copied term shows the white space, which would require you to have to perform a Clean function  if you were to search on this term.





9.2 Translate via Search Term Text Fields

Translate can be launched from nearly every input text field deployed with STAR via your right mouse click action. You will notice that when you do this, the Google Translate Dialog will appear with the search term from the text field in which you initiated the right click copy action.

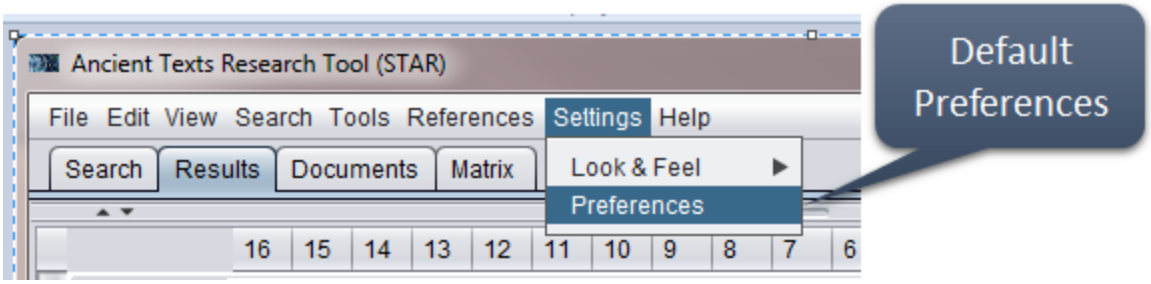


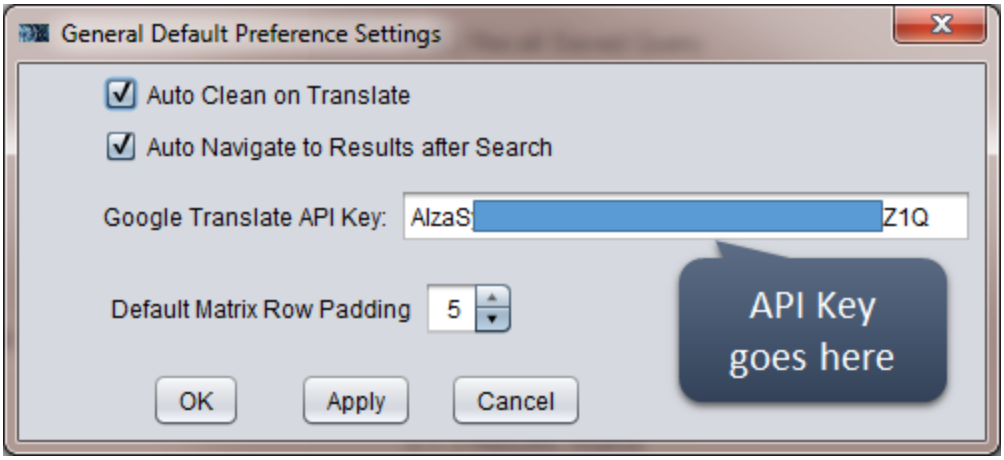
9.3 Quota Limit

Since STAR is using a paid service of Google, your initial software license is limited to a maximum of 10,000 word translations. If you love the Translate feature and believe you will go beyond the initial quota, you can purchase your own Google Translate API key directly from Google and use it within your instance of STAR. The following link provides a starting point for you: https://cloud.google.com/translate/docs/

Google provides two months of free nearly unlimited translation service before you need to start paying the very minimal fee (i.e., $20/1,000,000 characters).

Once you acquire your own API key, you need to store it in your default preferences as shown in the snaps below.



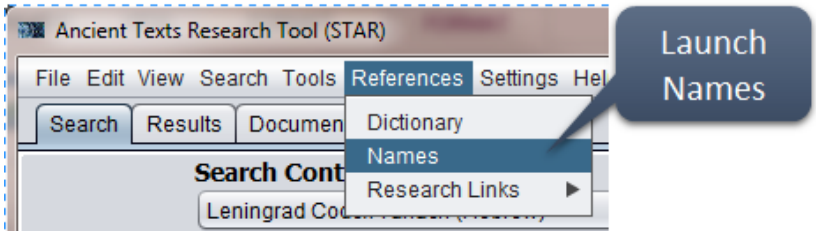


10 Names

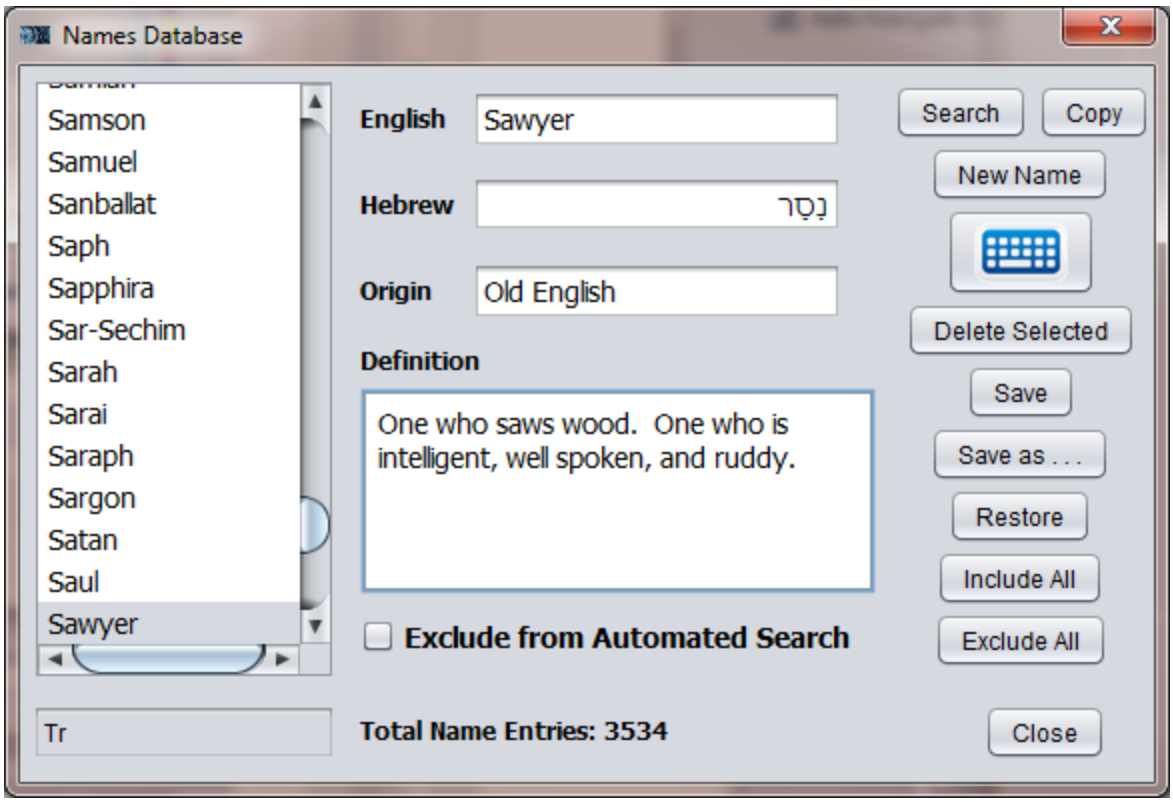
The Names database feature has been highlighted upon in the Quick Start Section of the manual, but the deep dive details are found here.

The Names Database can be accessed via the Names Button 

on the Search Pane, or via the Main Menu as shown to the right. The dialog will appear as shown below.



You should be aware that the database may also be used for performing an exhaustive search within a matrix, details of which are explained in the section Searching Names Within a Matrix.

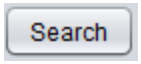


A detailed description of the options available for this utility are explained in the following subsections.

10.1 Scroll Bar and Quick Find

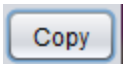
The scroll bar and the *Quick Find Field* (below the scroll list) provide the means to navigate the Names Database. Each consecutive letter you type in the *Quick Find Field* performs another search to resolve the name.

10.2 Search

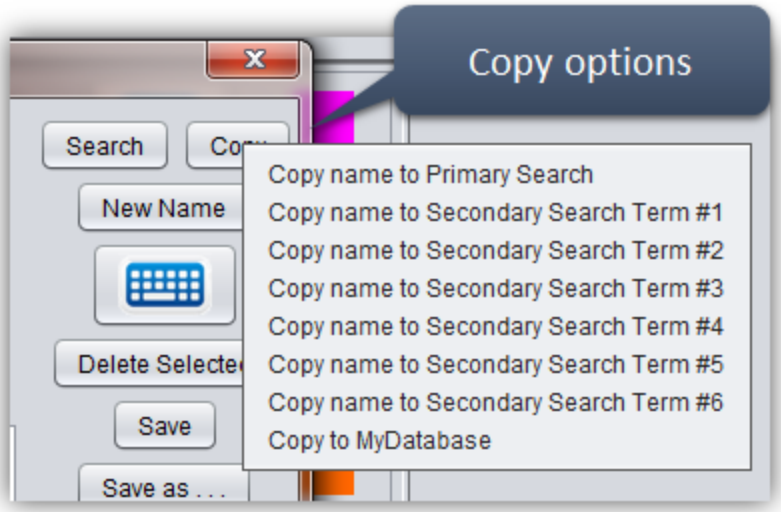
Selecting the Search Button 

on the dialog copies the name to the Primary Search fields based on the language you will be using as your search source.

10.3 Copy

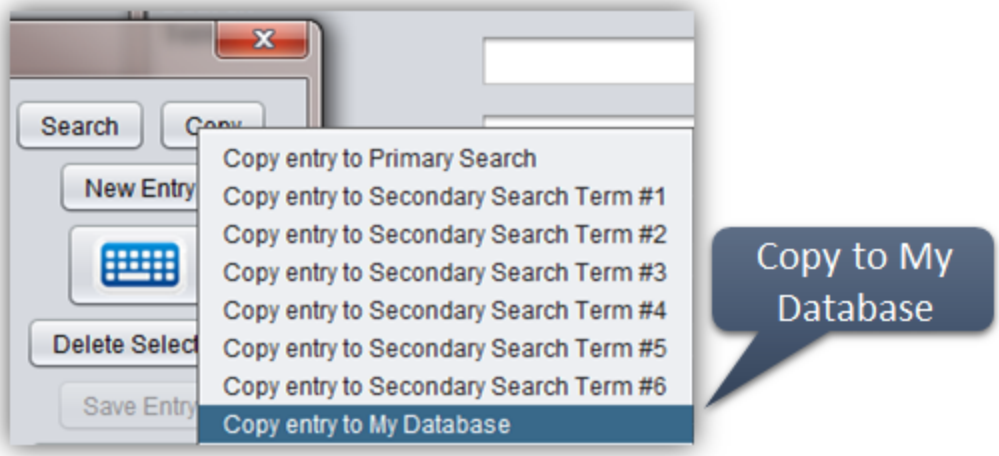
The Copy Button 

provides a popup menu with a list of target search fields for you to direct the copy of the selected name.

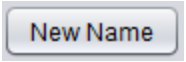


10.3.1 Copy Name Entry to My Database

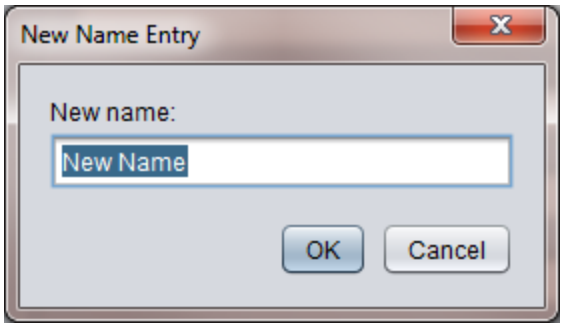
The copy button shown in the snap above also provides you the ability to copy any selected name entry right to your customized *My Database*. Once copied, you can launch the *My Database* dialog and edit entries as desired.



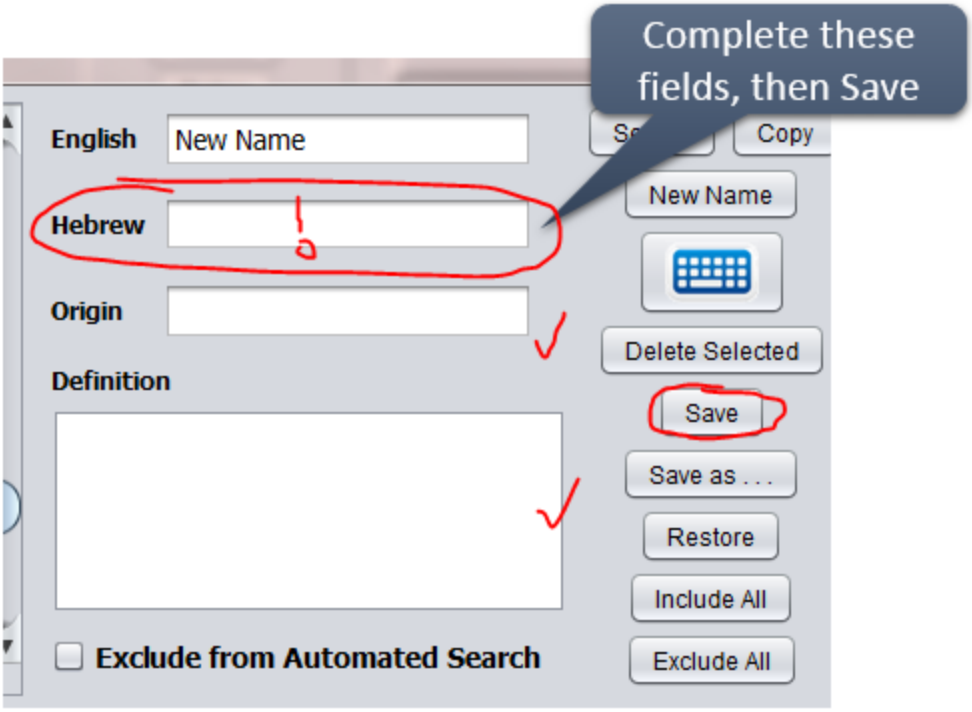
10.4 New Name

The New Name Button 

provides the ability to add new entries to the Names Database. When you select this button, a popup will be displayed for you to provide the new name. Once you have done that, you can update all the remaining descriptive fields for the new name entry and then save.



Entering values for the Origin and Definition fields are optional since they have no bearing on Search, but the Hebrew field is critical if you are to be using the name in the search of Hebrew source texts. You can do a quick translation of the English name by performing a right click in the name field (future release).



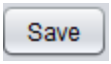
10.5 Hebrew Keyboard

The Hebrew Keyboard  can be utilized to fill in your Hebrew name if you are not copying it in from other source. You may also want to use the Hebrew Keyboard to make changes to the spelling of names.

10.6 Delete Selected

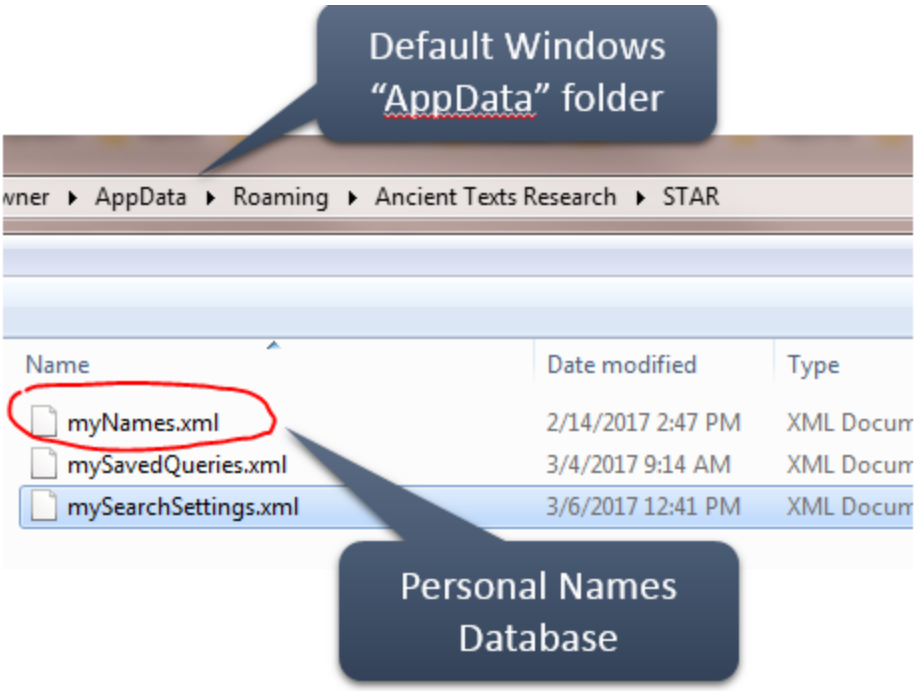
This provides you the ability to delete names from your Name Database. You must perform a Save for the delete to become permanent in your personal copy of the database.

10.7 Save

The Save Button 

is used to save all changes to your private version of the Names Database. Saving will permit your changes to persist between sessions. Once you have performed a Save, STAR will no longer read in the Factory default version, but rather your personal version of the Names Database.

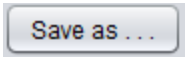
The personal copy of your Names database is saved within your default AppData folders based on your operating system. For the Windows OS, you will find that folder typically under `C:\Users\UserName\AppData\Roaming`, where "`UserName`" is your login. From that folder navigate to the "`Ancient Texts Research\STAR`" folder. You will see a number of XML files unique to your account, including the *myNames.xml* file.



10.7.1 Sharing Your Names Database

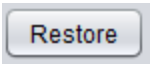
Since you now know where to find the Names Database file, you can send this on to your friends and research partners in the event you want to use one Names Database over another. You can also copy one that you receive right into this folder to be used by STAR. Just be careful to save a backup copy in advance.

10.8 Save As

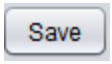
The Save As … Button 

provides you to save the Names Database anywhere on your computer to any name you like. This is a great tool to use if you plan to copy over the myNames.xml file and want to make a backup before hand.

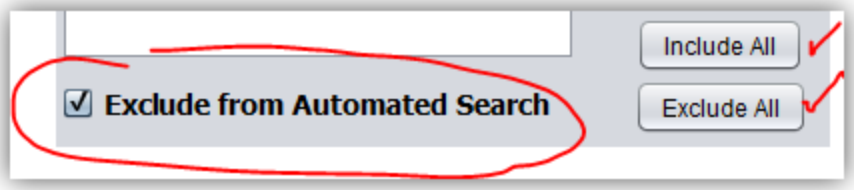
10.9 Restore

The Restore Button 

enables you to refresh the Names Database with the one that came with the installation of STAR. You can totally revert back to using the factory version by

either deleting the *myNames.xml* file from your working App directory, or by performing the Restore function followed by a Save  to the personal Names database.

10.10 Include All/Exclude All



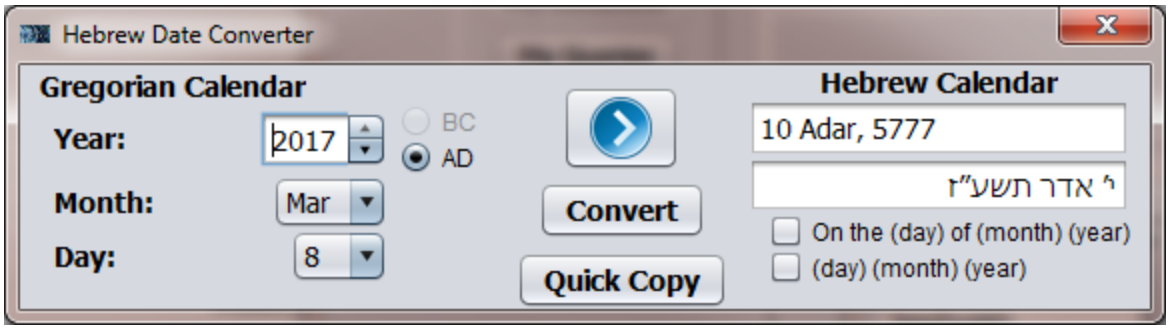
These functions control how the Names database will be used in a Search within A Matrix search. Details of their use are provided the section *Searching Names within the Matrix.*

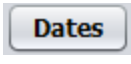
11 Dates

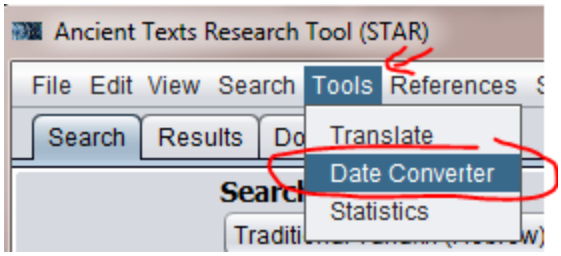
Although we have attempted to incorporate social media aspects of technology into STAR, the usage of our term *Dates* is not to be confused with "courting a girl" or "going out on date". The *Dates* capability within STAR refers to conversion of Gregorian calendar dates with Jewish/Hebrew calendar dates and vice versa.

STAR provides two very powerful tools. The first is the Hebrew Date Converter that enables you to convert Gregorian dates to Hebrew equivalents, and the *Search Dates* capability (again, not to be confused with a matchmaking service). Both capabilities are explained here.

11.1 Hebrew Date Converter



The H*ebrew Date Converter Dialog* can be launched from either the *Dates Button*  on the *Search Pane*, or via the Tools Menu.



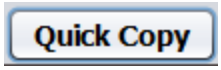
You can set the Gregorian Calendar data via the year, month, and day controls and then select Convert 

to view the Jewish and Hebrew equivalents. Results for year 1752 AD and earlier may be inaccurate.
STAR's algorithm does not take into account a correction of ten days that was introduced by Pope Gregory XIII known as the Gregorian Reformation. See this link from Wikipedia for more information on that: https://en.wikipedia.org/wiki/Adoption_of_the_Gregorian_calendar

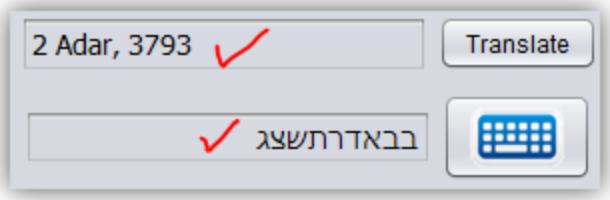
The results you receive are fairly consistent with what you will find on web based conversion tools such as HebCal: https://www.hebcal.com

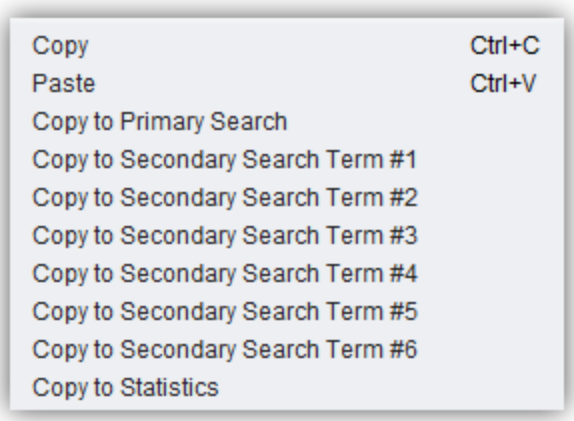
The tool provides the converted data in a Jewish equivalent at Hebrew based on the formatting options shown here. With "on the (day) .. " checkbox selected, the Omer prefix, a Bet ('ב') will be added to the front of the date as shown. This is a notation for Search, because it will always result in a date with an additional letter count, decreasing the odds of the date to be found in a matrix.

11.1.1 Quick Copy

Once you have converted your date to your liking, you can use the *Quick Copy Button* 

to send your Hebrew date to the primary search field as shown. The Quick Copy will perform a standard "Clean" of the white spaces and consonant normalization as part of the copy.





11.2 Copying to Other Search Fields

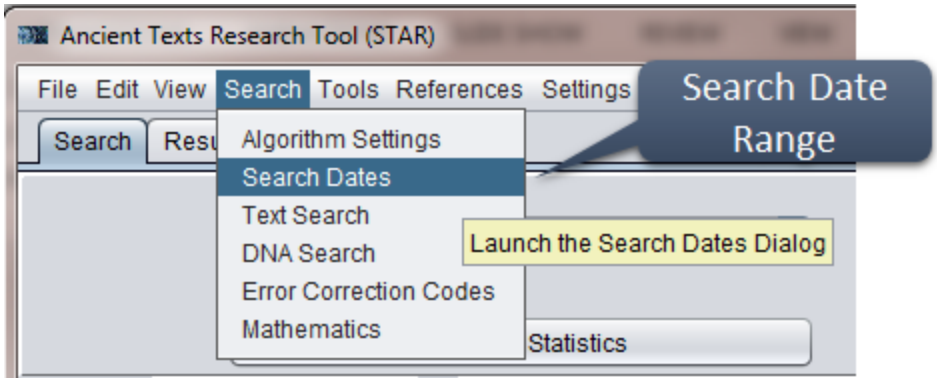
If you right click on the Hebrew text field containing the date, a list of popup options will be provided for you to send your result to any of the numerous search fields and other utilities in STAR.

11.3 Searching Dates

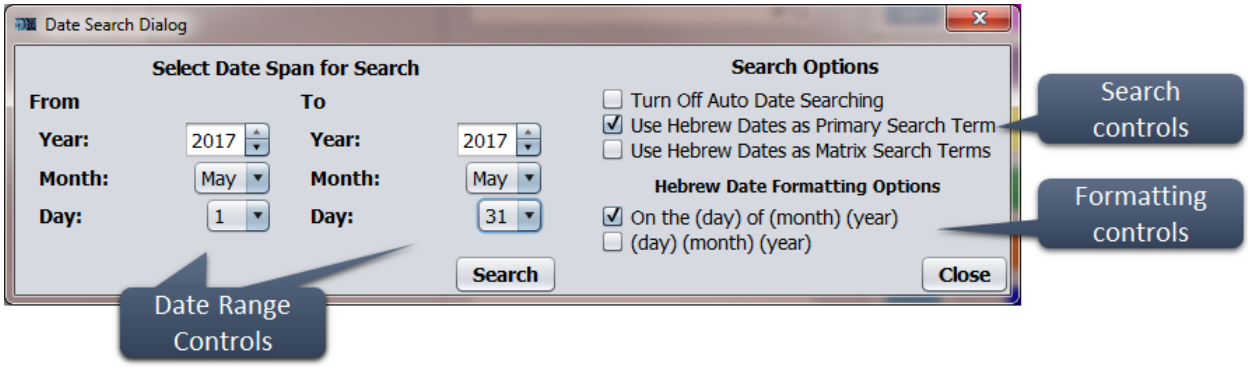
STAR provides another novel capability not previously available in any of the legacy tools. Using STAR, you can perform an exhaustive search based

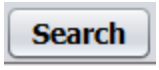
on a specified date range. This feature is available for both Primary Search and Search within a Matrix.

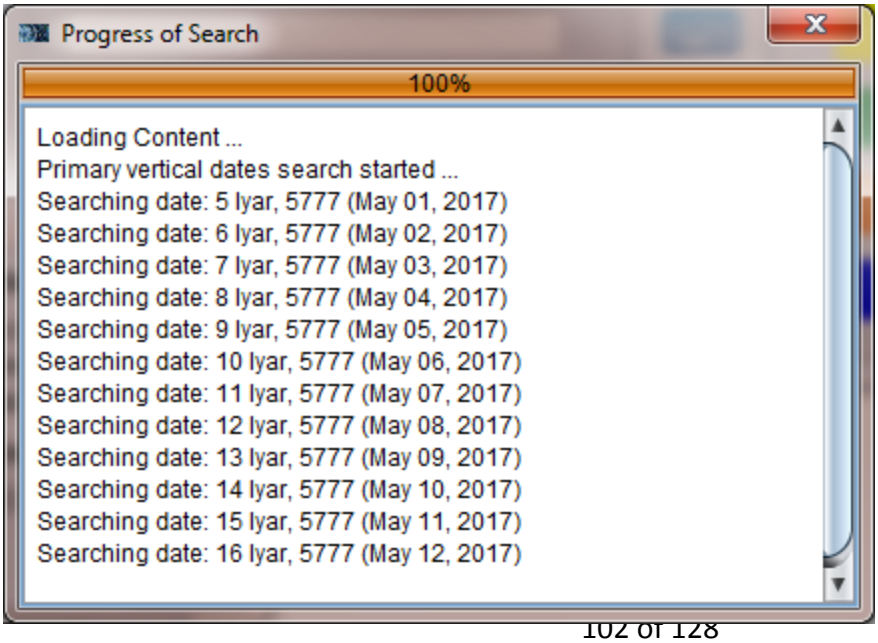
11.3.1 Primary Search



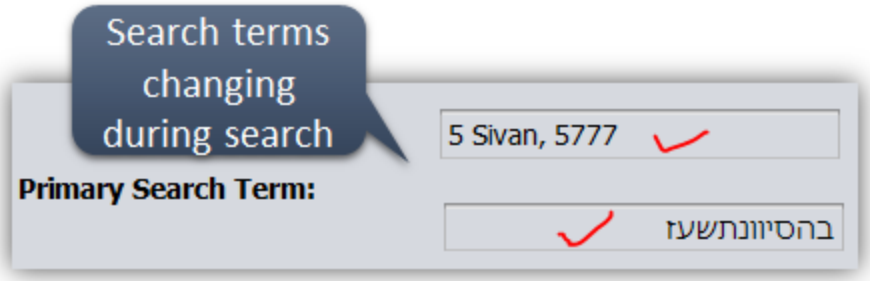
You can access the *Search Dates Dialog* for searching a range of dates via the Main Menu as shown above.



The Date Search Dialog is organized by the date range input controls to the left, where you specify the span of dates you wish to search, and the search and formatting controls on the right. You can use the  button on the dialog to initiate a Search right from the dialog. Before you do this, make sure you have set your EDLS range settings. With the "Use Hebrew Dates as Primary Search Terms" check box selected, you have the option of closing this dialog, and starting Search from the *Search Pane*. You don't actually have to close the dialog. You can keep it off to the side of your desktop if you wish.

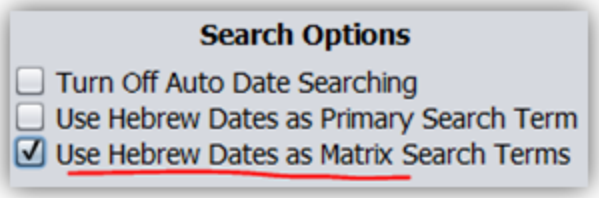


Once you start a search, you will see the *Progress of Search* Dialog reflect the progression of each of our date range terms being searched. The search term fields on the Search Pane will also be changing rapidly as each date is being evaluated for your range of EDLS skip settings.



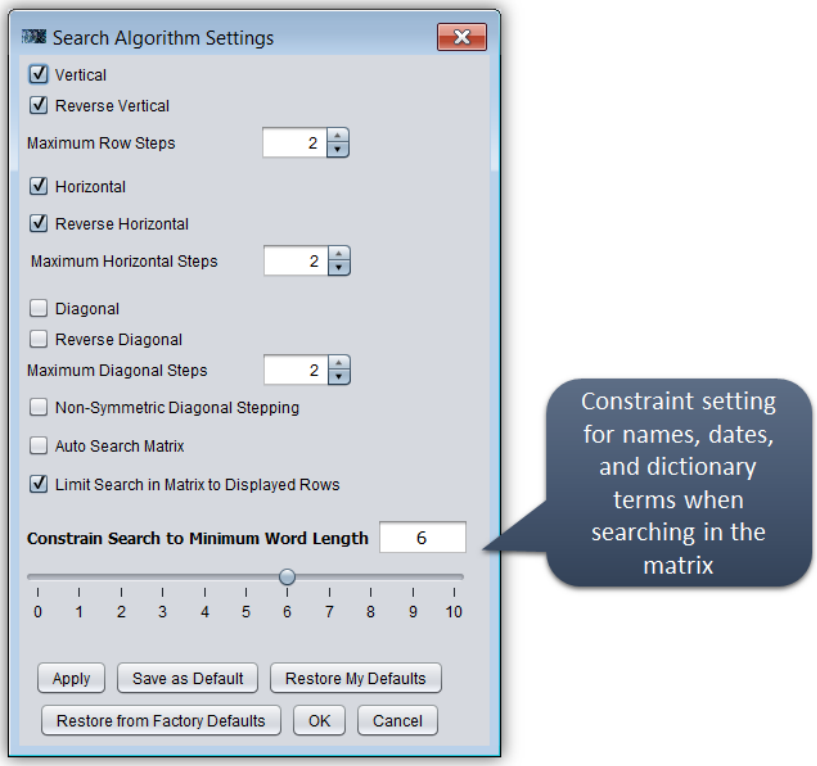
11.3.2 Search within a Matrix

Evaluating your Date range for searching within a matrix works much like primary search. You simply need to select the "Use Hebrew Dates as Matrix Search Terms" before launching the search within a matrix.

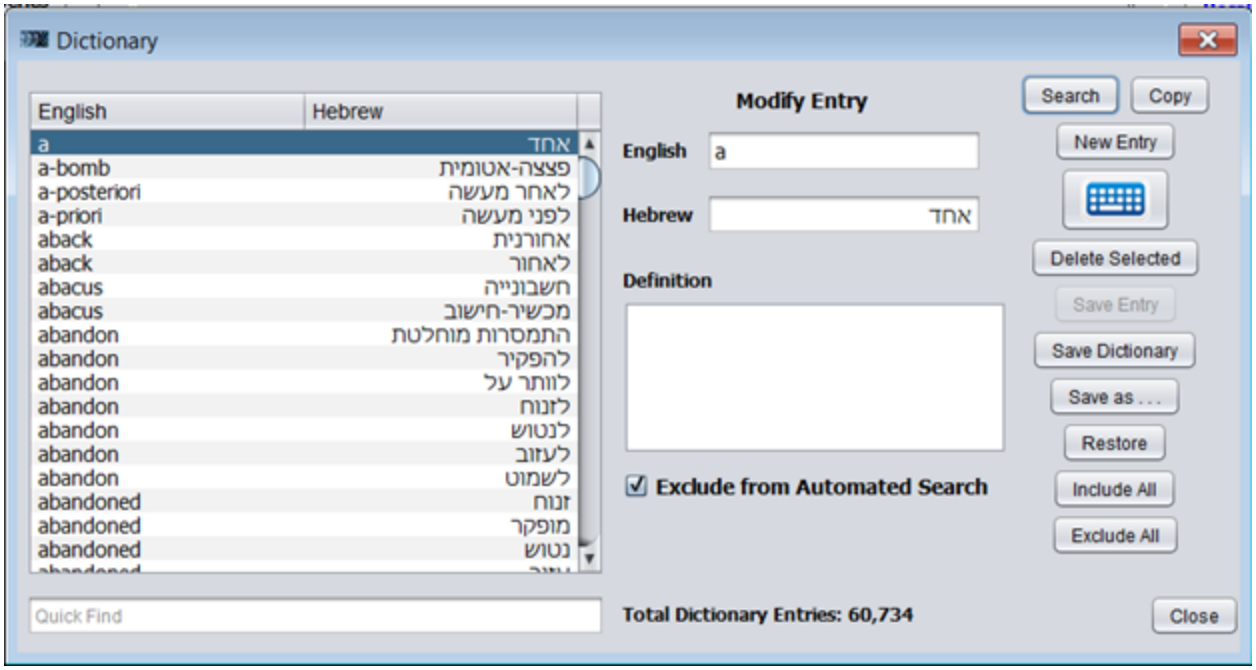


11.3.3 Dates Filtered by Length

As a reminder, when you search for dates, the word length limit applied in the *Search Algorithm Settings Dialog,* will result in searches on dates that are greater or equal in length to the *Constrain Search to Minimum Word Length.* The setting applies to name, date, and dictionary searches. By using this control, you can limit searches to those that are truly relevant, i.e., those dates with considerable length.



12 Dictionary



The Dictionary Dialog provides a convenient way to search for search terms and apply them in your Primary Search as well as secondary terms for search within a matrix.

The Dictionary also enables you to Search Within a Matrix all of it's 60,734 definitions. You have the ability to add terms, modify terms, and save a unique copy of your Dictionary that can be shared with fellow research partners.

12.1 Navigating Word Entries

12.1.1 Quick Find

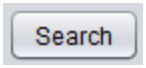
Within the Quick Find text field, type in the first letter of the word term you are seeking. The table will automatically navigate to the closest matching word. Continue to refine your search by typing subsequent letters of your word.

12.1.2 Sort

The Dictionary Dialog provides the ability to sort your dictionary word terms in alphabetical order by language. To change the sort, click on the header language label, i.e., "English" or "Hebrew". The table will immediately resort alphabetically based on the selected language.

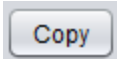
12.2 Primary Search

12.2.1 Quick Search

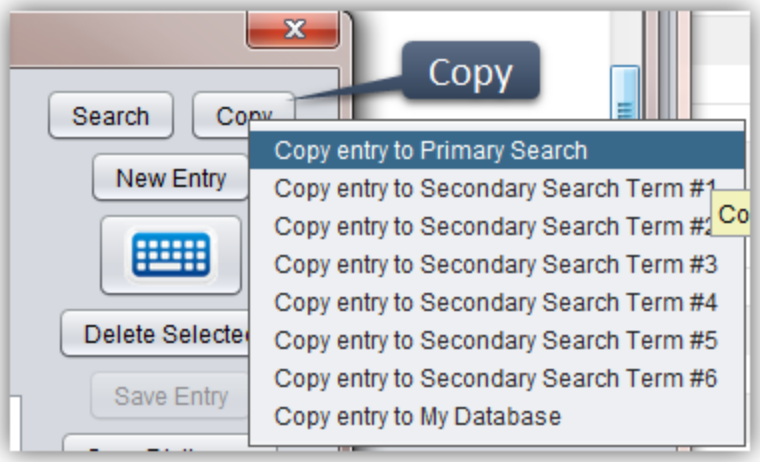
The Search Button 

on the dialog will copy the Hebrew and English equivalents of your selected Dictionary entry to the Search Pane and launch a search based on your existing EDLS and document range settings. Remember that these searches also depend on your algorithm settings.

12.2.2 Copy to Search

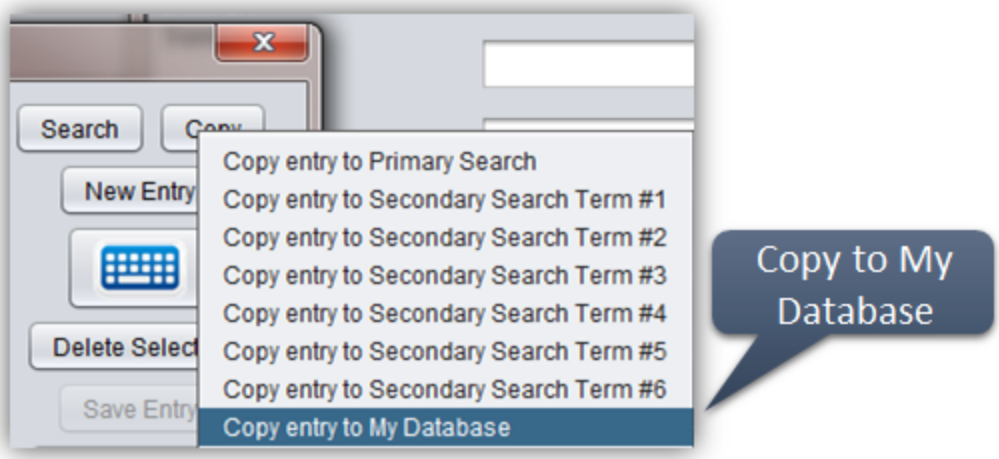
The Copy Button 

launches the obligatory popup menu from which you can select a host of options to copy your entry.



12.2.3 Copy Dictionary Entry to My Database

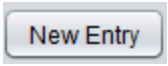
The copy button shown in the snap above also provides you the ability to copy any selected entry right to your customized *My Database*. Once copied, you can launch the *My Database* dialog and edit entries as desired.



12.3 Modifying Word Terms

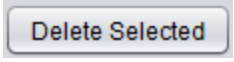
You have the ability to modify your Dictionary entries using the input text fields and other controls that have been previously explained with other dialogs of this type (e.g., the Names Dialog).

12.4 Creating Word Terms

You can use the New Entry Button 

to add words to the dictionary as previously explained for the Names database.

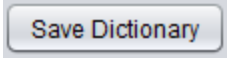
12.5 Delete Word Term

You have the ability to delete words via the Delete Selected Button 

. You will be prompted with a confirmation before STAR deletes the entry. Per previous explanation of these Dictionary type dialogs, persistent changes will not take place unless you save your changes to your personal copy of the Dictionary via the Save.

12.6 Saving

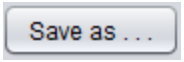
12.6.1 Personal Copy

The Save Dictionary Button 

is provided for you to save your changes so that they are persisted between sessions. Like the other databases, that copy is maintained in the your default AppData folders based on your operating system. For the Windows OS, you will

find that folder typically under `C:\Users\UserName\AppData\Roaming`, "UserName" is your login. The Dictionary file is titled "myDictionary.xml".

12.6.2 Save As . . .

The Save As … Button 

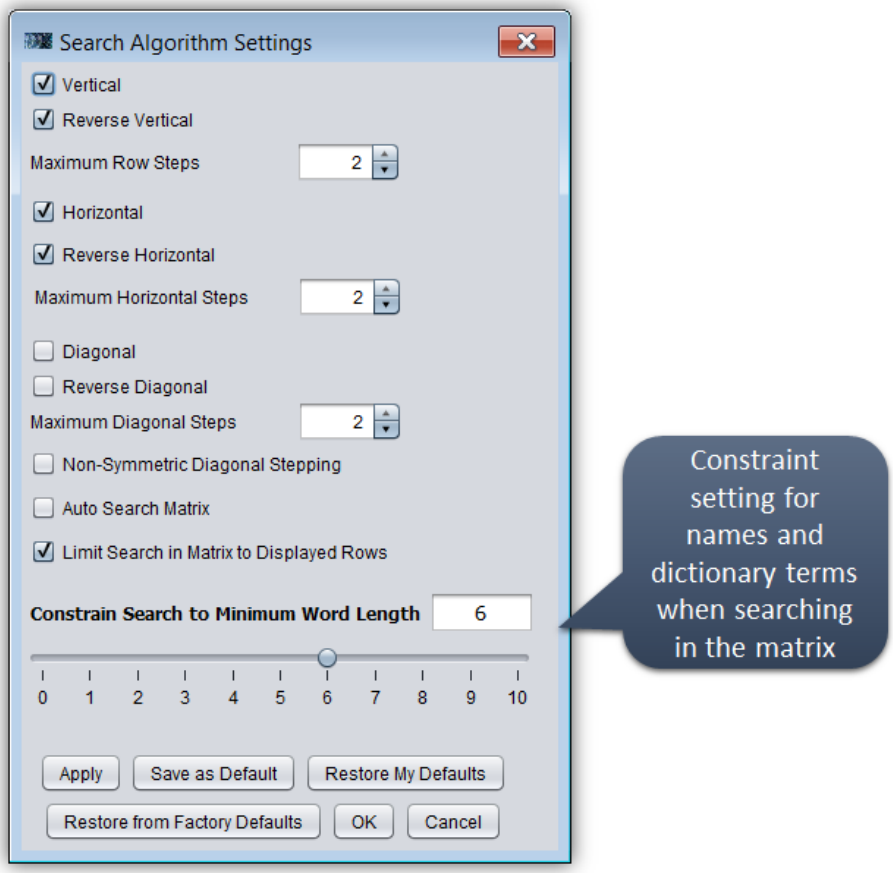
enables you to save a copy of the Dictionary to a unique name anywhere in your file space.

12.7 Restore Factory Dictionary

Refer to the Names Dictionary discussion on this topic. This features behaves exactly the same, but for the Dictionary.

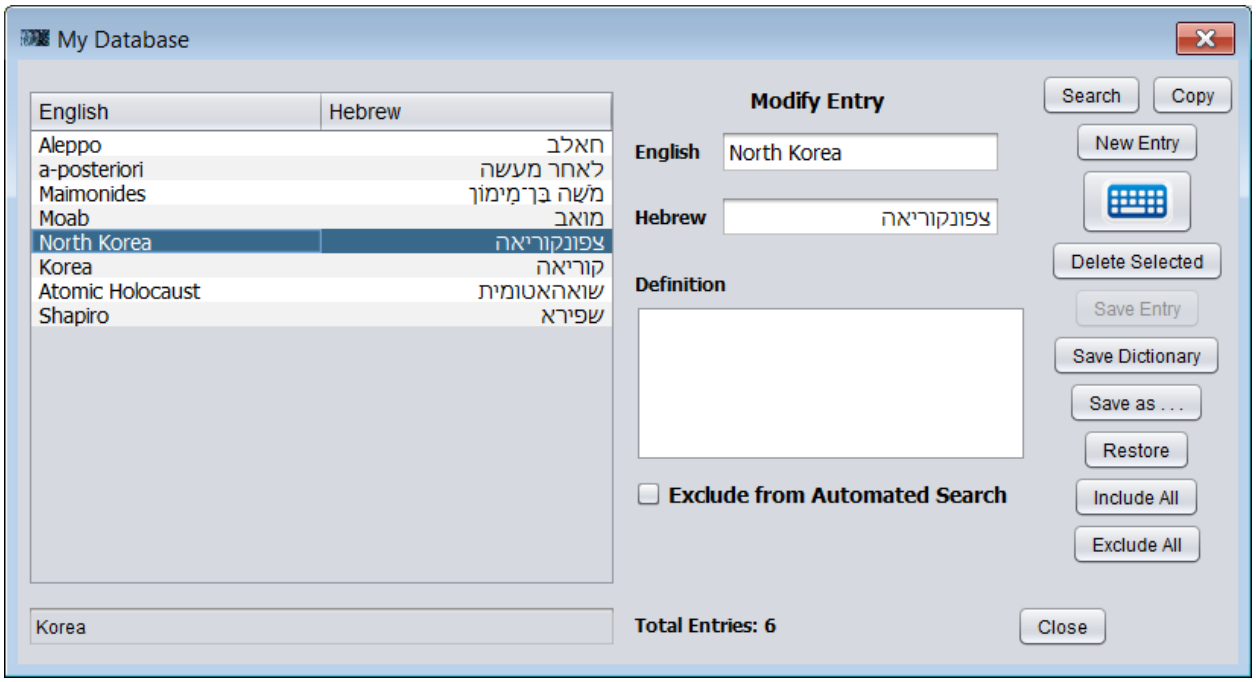
12.8 Search Within A Matrix

See the previous discussion in the Names Dictionary section that explains the use of the "Include All" and "Exclude All" controls and how the settings of the "Exclude from Automated Search" checkbox effect searching within the matrix. Also, be advised that the length of terms that are searched is governed by the *Constrain Search to Minimum Word Length* found on the *Search Algorithm Settings Dialog.* The setting provides the first order of filtering of database terms via a minimum word length setting. The *Constrain Search to Minimum Word Length* setting applies to both names and dictionary searches. By using this control, you can limit searches to those that are truly relevant, i.e., those dictionary terms with considerable length.



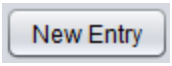
13 My Database

My Database serves as your own customized repository of search terms. You have the ability to create these terms by copying from other databases, or simply using the *New Entry* button of the *My Database Dialog* to create your terms from scratch.



Since the *My Database Dialog* uses all the same features and functions as explained for the *Dictionary Dialog*, details of each button are not repeated here, except to highlight key features. Refer to the description of the functions in the Dictionary section of this document for a generic explanation of the GUI controls.

13.1 Creating Search Terms

There are two methods to creating new search terms for *My Database*. You can either copy terms from other elements in the STAR GUI (see following section on how to copy terms from *Names* and *Dictionary*), or simply use the *New Entry* button 

on the dialog. Having created a new entry, simply fill in the English and Hebrew equivalents of your search term.

13.2 Copying Dictionary and Name Terms to My Database

As explained in both the *Dictionary* and *Names Sections* of this document, dictionary and name terms can be copied over to *My Database*.

13.3 Saving My Dictionary

In the case of *My Dictionary*, when you save via the dialog, the database/dictionary is saved to a file called *MyDatabase.xml.* For Windows users, this will be saved (with your other personalized resources) into the under `C:\Users\UserName\AppData\RoamingAncient Texts Research\STAR folder` where `"UserName"` is your login.

13.4 Search Within a Matrix

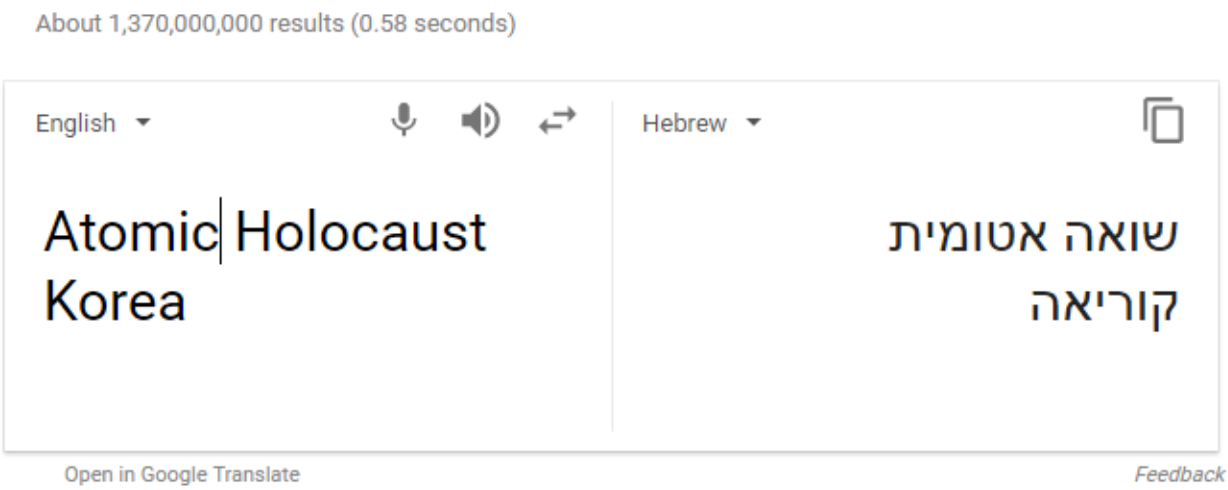
To search your My Dictionary terms within a matrix, simply check the My Database checkbox as shown.

The search will behave just like it does for searching from the Names or Dictionary databases. The terms searched will depend on whether you have included them for search and they meet our minimum search term length setting.

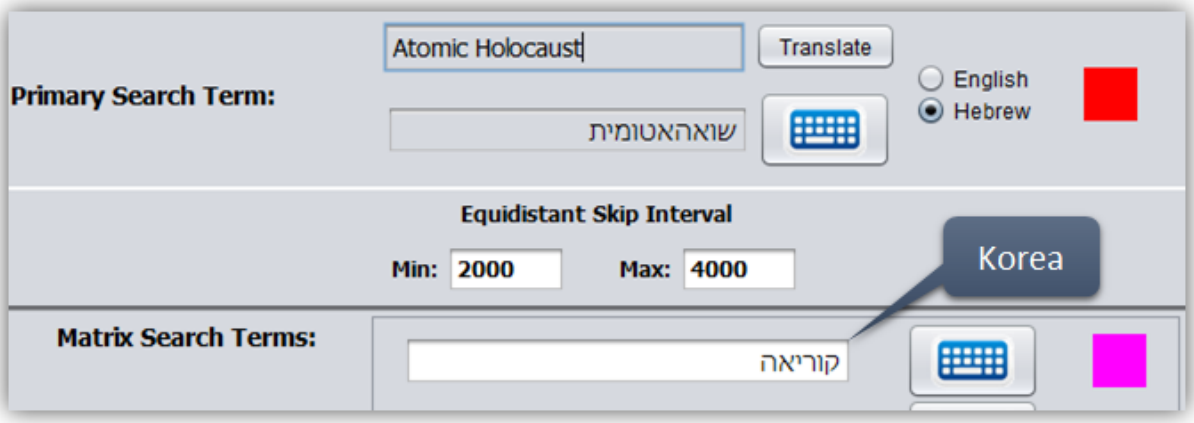
14 Statistics

This section picks up where the Quick Start Section introducing the STAR Statistics capability left off. If you have not read the "Travis Test" use case under the Quick Start Potpourri Intro to Statistics Section, you may want to return to that section and review our introduction to one of the most powerful capabilities in STAR.

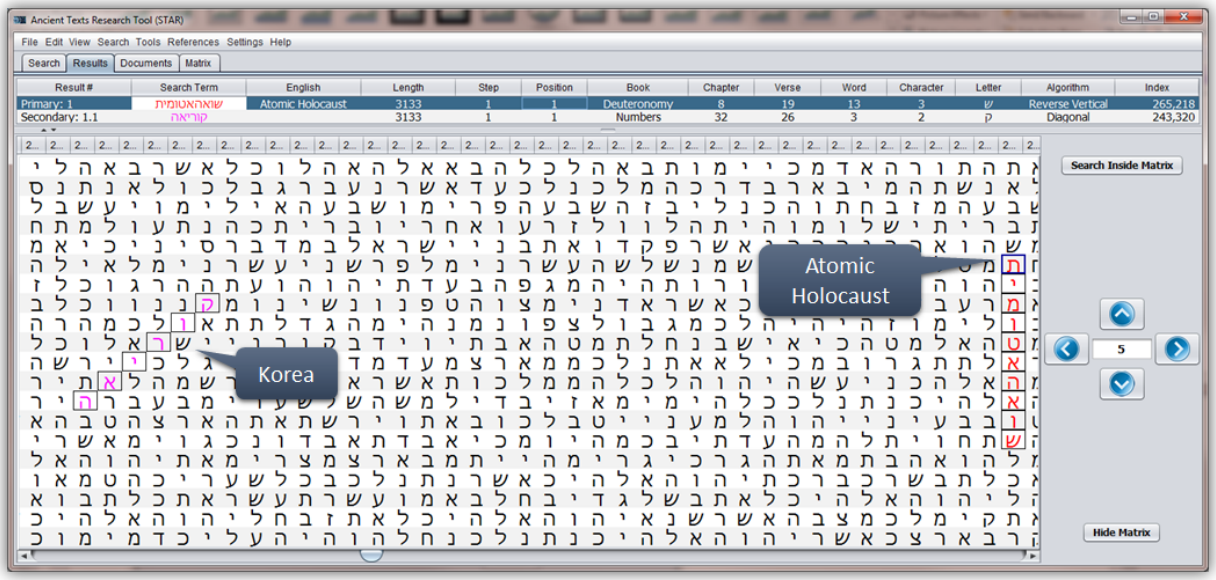
We'll be introducing a new use case in this section to help walk you through the concepts of the Statistics functions. The use case covers a current event that just took place at the time of writing this manual. The event entails the launching of four North Korean missiles over Japan on March 6th, 2017 (a well publicised event). While working on this section of the manual, we were provided the strange results showing "Korea" in a matrix formed by the primary search term "Atomic Holocaust". The translation from Google looks like this:



Since STAR also uses Google for Translate, you get the same results if you perform the translation on board, and you can create a Search like this (note, we were already tipped off that the result would show up at an EDLS skip of 3133 .

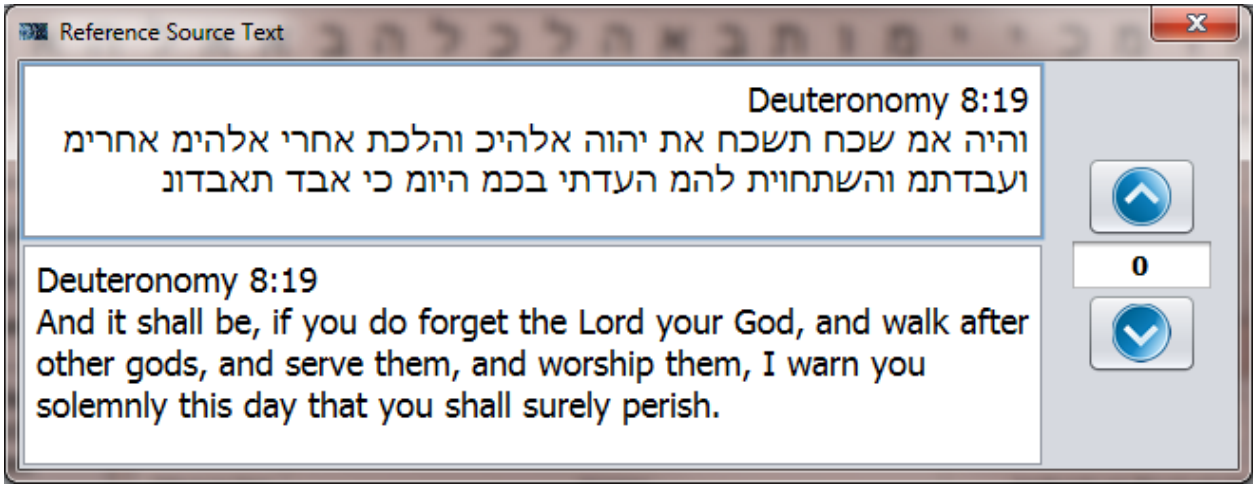


With few keystrokes, we were able to reproduce the result as shown below.



The question we should all be asking is whether this finding is strange, or can it be explained by complete randomness of the text being searched, i.e., if we assembled a randomized version of the same source text while maintaining the same character distributions, could we possibly get a result like this?

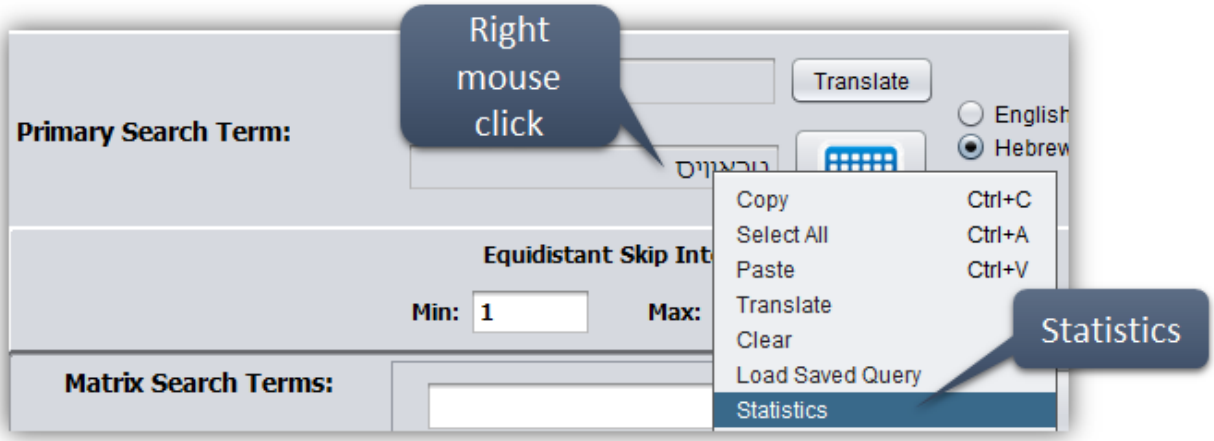
One additional facet of this use case that we picked up on is the reference text behind the result. We found this by right clicking on the first letter of the result in the matrix and selecting from the popup menu to see this reference text.



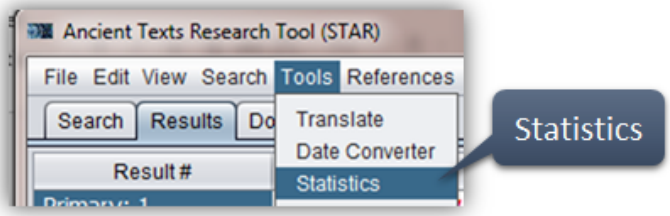
Now, let's take you through the features of STAR Statistics to help us determine if this is really a phenomenal result, or just a likely random occurrence.

14.1 Launching

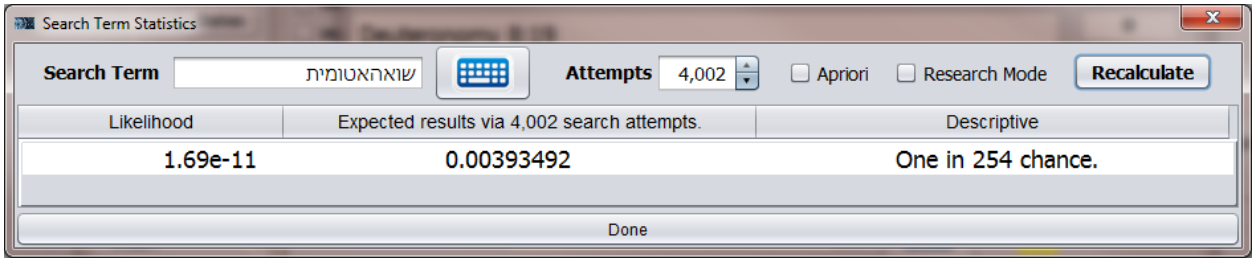
STAR provides two primary methods for launching the Statistics utility dialog. Many of the input fields have a right click popup menu that will display an option for Statistics. Launching Statistics in this fashion will copy the search term (from which you right clicked) into the Search Term Statistics Dialog.



You can also access Statistics via the tools menu. For this use case, we suggest you launch statistics right from the primary search term field so that the search term will be automatically loaded into the utility dialog.



Before you launch statistics, ensure your document range is set to the entire Traditional Tanakh. The summary stats for this scenario when launched will look like this.



14.2 Summary Mode

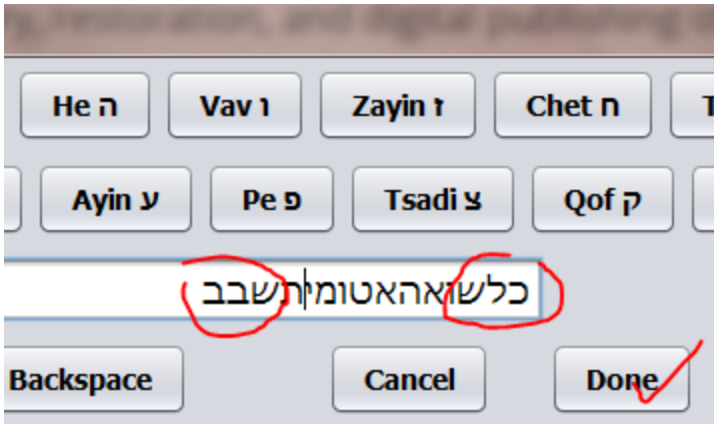
What you are seeing in the previous snap are the statistics calculated for the “Atomic Holocaust” search term in summary mode. By the looks of it, this result may seem a little odd, but not quite into the edges of “phenomenal” since we see that the likelihood of finding this

term had one in a 254 chance of existing just based on treating the letter sequence like string of random characters. The following subsections explain each element of this dialog in Summary Mode.

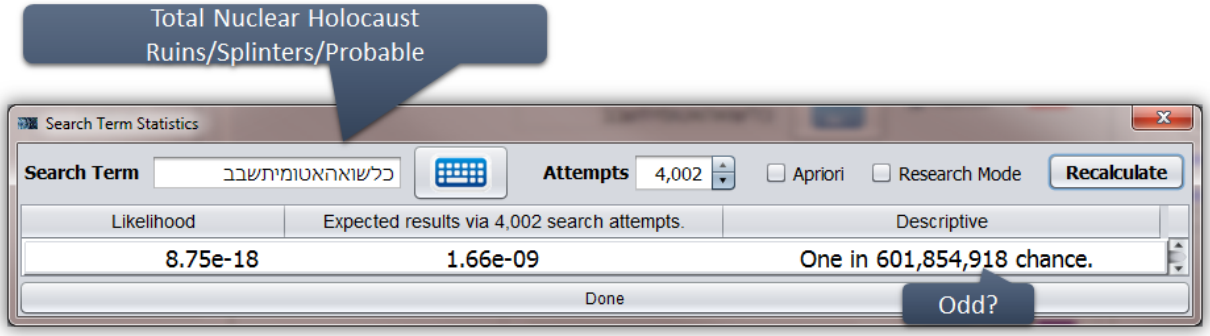
14.2.1 Search Term

The search term field identifies the term that was evaluated in the statistics calculations. To enhance on this use case a bit, let's add some additional letters to the "Atomic Nuclear" phrase. You can use the Hebrew Keyboard to add 'כל" to the front of the term (which translates to "All", or "Total"), and add the suffix 'שבב'. The suffix, the comprising the Shin-Dalet-Dalet is not so interesting when you use the Google Translate feature, but if you use the onboard reference to the Two Letter Lookup via the References menu, you have a very interesting and authoritative definition as shown below.

Putting all these letters together, you now should have this term in your Keyboard where we have circled the prefix and suffix. This search term may now be expanded to mean "Total Nuclear Holocaust Ruins/Splinters/Probable".

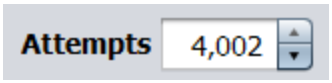


Returning back to your Search Pane, right click again into primary search field to launch the statistics.



Our chance of this term (if that is truly what you were seeking right from the start), is one in nearly a billion, which is obviously, highly unlikely.

14.2.2 Attempts

Attempts  shown in the dialog indicate how many tries the tool had in attempting time find the search term. In this case, STAR calculated that you would attempt 4,002 search attempts. Since we configured Search to with an EDLS skip range between 2,000 and 4,000, STAR figured out that we made 2,001 attempts via a Forward Vertical Search, and another 2,001 attempts searching Reverse Vertical.

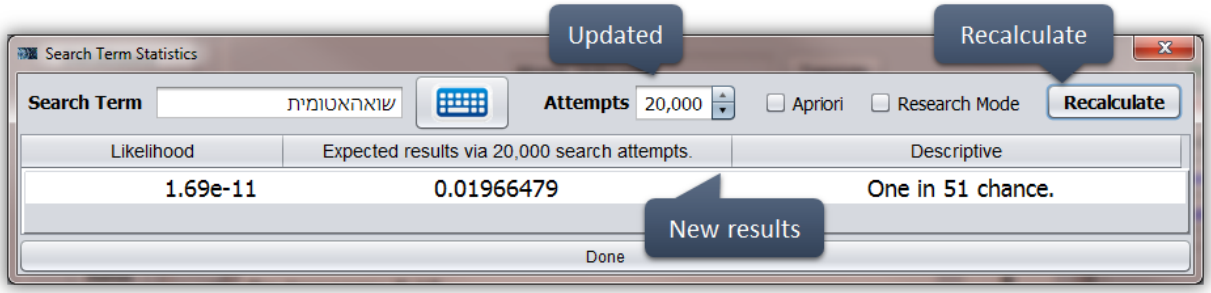
Attempts are used in calculating the *Expected Results* (aka *Expected Value*). In probability theory, *Expected Value* is the is the long-run average value of repetitions of the experiment it represents. The equation looks like this:

$\mathrm{E}[X] = x_1p_1 + x_2p_2 + \cdots + x_kp_k$, where x_i is the value of each independent event at probability p_n of occurring. For our search case, value of each outcome is exactly one (1), i.e., the results was found. The p's are the probability of the result being found at any EDLS skip length. The p's are all equal, and shown in the dialog as the term *Likelihood* (that is the probability of a result begin found in one search).

The Expected Results calculation is thus completely simplified as the product of probability times the Attempts:

$$\textit{Expected Results} = p * \textit{Attempts}$$

If we had done a search between 1 and 10,000, the control would indicate 20,000 *Attempts*, and our expected results would show. The *Attempts Spinner* allows you to change the *Attempts* value without having to actually change your settings on the *Search Pane*. By making the change and re-calculating, you can see now that our chances of finding this search term is now one in a 51 chance.



14.2.3 Likelihood

This is the probability of the search term being found in one search attempt of any algorithm, e.g., a vertical search, reverse vertical, etc..

14.2.4 Expected Results

As explained above, this is the number of results we can expect by performing repeated independent searches.

14.2.5 Descriptive

Provides an English readable interpretation of the odds of finding the results given all the conditions of the search and the nature of the document being searched.

14.2.6 Apriori

Apriori is an option we'll go into more detail later under the Research Mode, but it identifies whether you were performing a blind search or something more targeted. Think of it as calling your billiard shot in advance. In this case, if we were looking for this term at precisely this section of the manuscript at Deuteronomy 8:19 because of some *apriori* information, then you should select this check box and recalculate your results.

14.2.7 Search Range

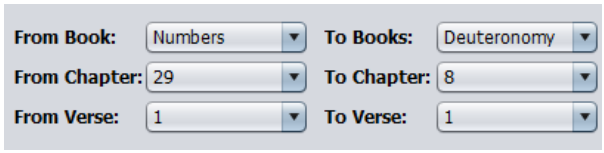
The range of your search plays a big part in the probability calculations in that it affects the pool of letters for which you can choose multiple combinations that might form your search term. The smaller that pool, the less likely the search term has a chance of being found.

This will come into play when we evaluate the "Korea" term of our use case. In the situation of searching for a matrix term, we know that we have restricted our document range to the area of the text that surrounds the primary term in the matrix. In the case of the primary result, that range would be roughly as follows: Numbers 29 ⇒ Deuteronomy 8. This range can be easily determined by using the *Expand All* feature of the result via a right mouse click.

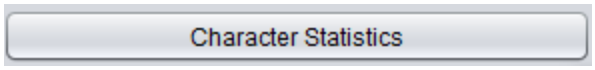
Result #	Search Term	English	Length	Step	Position	Book	Chapter	Verse	Word	Charact...	Letter	Algorithm	Index
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	1	Deuteronomy	8	19	13	3	ש	Reverse Ve...	265,218
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	2	Deuteronomy	6	18	3	4	ו	Reverse Ve...	262,085
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	3	Deuteronomy	4	40	22	1	א	Reverse Ve...	258,952
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	4	Deuteronomy	3	21	17	1	ה	Reverse Ve...	255,819
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	5	Deuteronomy	2	5	1	1	א	Reverse Ve...	252,686
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	6	Numbers	36	7	6	3	ט	Reverse Ve...	249,553
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	7	Numbers	34	6	11	3	ו	Reverse Ve...	246,420
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	8	Numbers	32	25	8	3	ת	Reverse Ve...	243,287
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	9	Numbers	31	16	10	2	י	Reverse Ve...	240,154
Primary: 1	שואהאטומית	Atomic Holocaust	3133	1	10	Numbers	29	9	1	5	ת	Reverse Ve...	237,021

14.2.8 Character Statistics

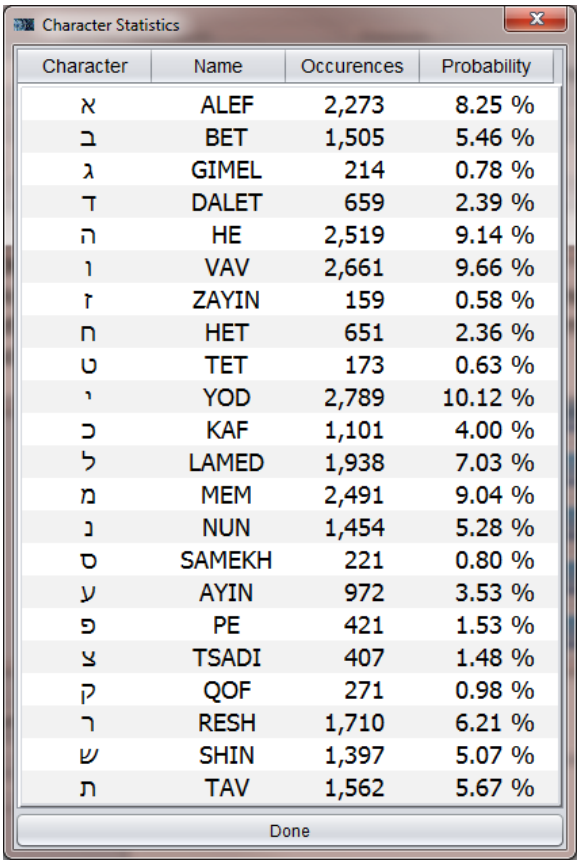
In determining the probability of any one letter being chosen out of the hat of randomly sorted letters, we calculate that from the letter distribution from the source text. Our Character Statistics Tools works hand-in-glove with the final search term statistics calculations. For example, to evaluate the search term "Korea" in the reduced document range of Numbers 29 ⇒ Deuteronomy 8,



our character statistics show the following (available by clicking the



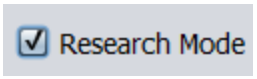
on the *Search Pane*.

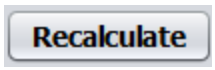


14.3 Research Mode

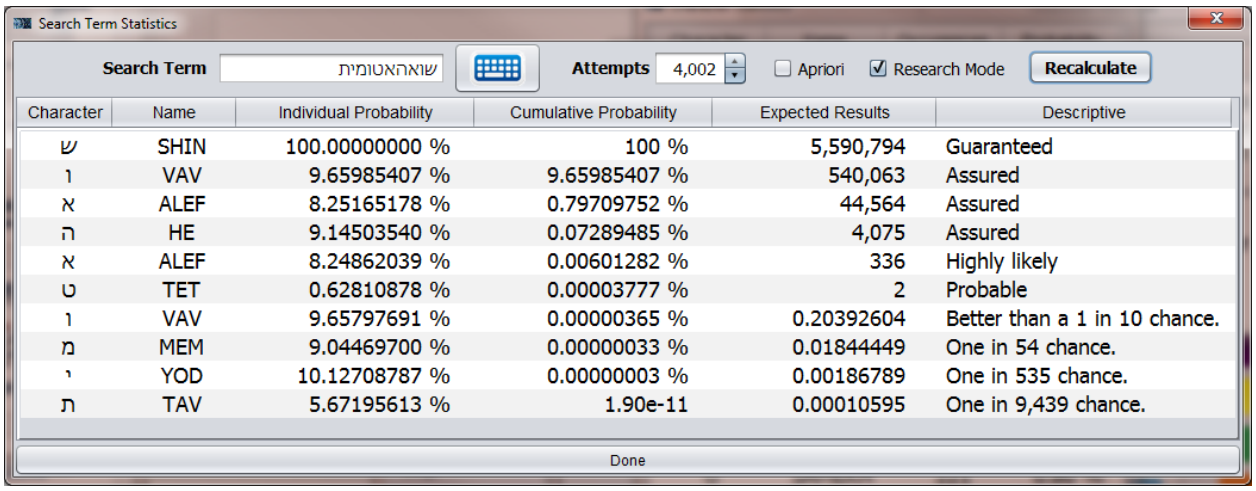
Research Mode of the Statistics Dialog provides further insight into the calculations for building up to our final answer shown in Summary Mode.

14.3.1 Toggling

Select the *Research Mode Check Box* 

to toggle to Research Mode, and then hit the *Recalculate Button* 

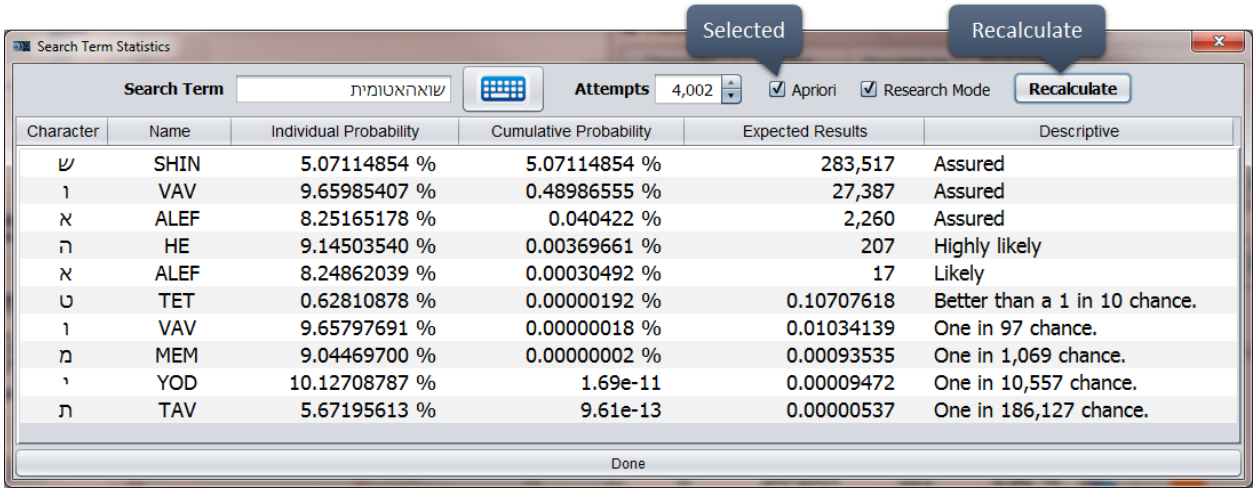
. The Search Term Statistics Dialog should look something like this:



Character	Name	Individual Probability	Cumulative Probability	Expected Results	Descriptive
ש	SHIN	100.00000000 %	100 %	5,590,794	Guaranteed
ו	VAV	9.65985407 %	9.65985407 %	540,063	Assured
א	ALEF	8.25165178 %	0.79709752 %	44,564	Assured
ה	HE	9.14503540 %	0.07289485 %	4,075	Assured
א	ALEF	8.24862039 %	0.00601282 %	336	Highly likely
ט	TET	0.62810878 %	0.00003777 %	2	Probable
ו	VAV	9.65797691 %	0.00000365 %	0.20392604	Better than a 1 in 10 chance.
מ	MEM	9.04469700 %	0.00000033 %	0.01844449	One in 54 chance.
י	YOD	10.12708787 %	0.00000003 %	0.00186789	One in 535 chance.
ת	TAV	5.67195613 %	1.90e-11	0.00010595	One in 9,439 chance.

14.3.2 Apriori Option

Now select *Apriori* on the dialog and recalculate. Your view of the dialog should show something like this:



Character	Name	Individual Probability	Cumulative Probability	Expected Results	Descriptive
ש	SHIN	5.07114854 %	5.07114854 %	283,517	Assured
ו	VAV	9.65985407 %	0.48986555 %	27,387	Assured
א	ALEF	8.25165178 %	0.040422 %	2,260	Assured
ה	HE	9.14503540 %	0.00369661 %	207	Highly likely
א	ALEF	8.24862039 %	0.00030492 %	17	Likely
ט	TET	0.62810878 %	0.00000192 %	0.10707618	Better than a 1 in 10 chance.
ו	VAV	9.65797691 %	0.00000018 %	0.01034139	One in 97 chance.
מ	MEM	9.04469700 %	0.00000002 %	0.00093535	One in 1,069 chance.
י	YOD	10.12708787 %	1.69e-11	0.00009472	One in 10,557 chance.
ת	TAV	5.67195613 %	9.61e-13	0.00000537	One in 186,127 chance.

In this mode, our probability of finding the Shin is based on the theory that you were only going to search this limited section of text for the search term. The cumulative probabilities are now much smaller, and the likelihood of this term having been found in the text at that location would be considered rather odd at a one in 186,127 chance. If you knew in advance to search it at exactly one EDLS length in one direction, the chance would be one in about 745 million.

14.3.3 The Underlying Math

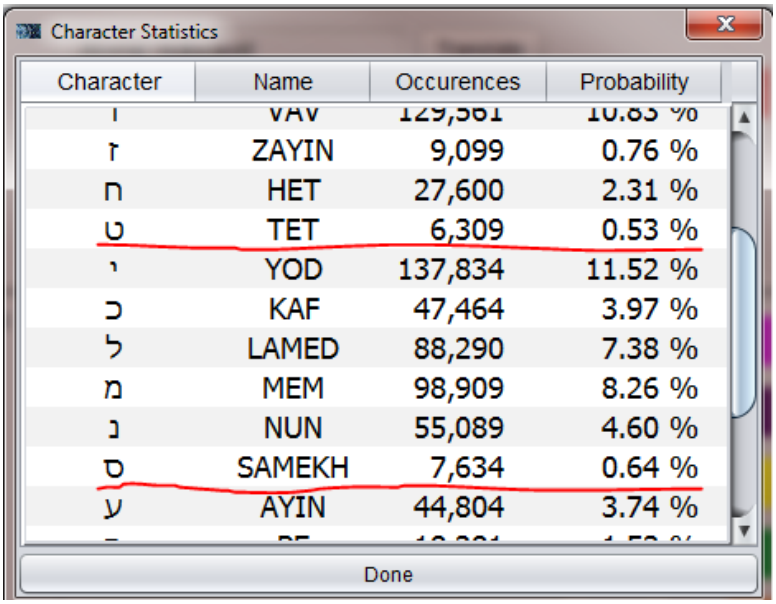
From the Research Mode view of the dialog, you can see how our final result is computed by calculating each letter instance probability independently and then computing a cumulative probability for each subsequent letter in the search term sequence. If you look at the second letter of the search term, the Vav ו, you will find that the probability of it occurring independently as a random event (e.g., pulling a letter out of hat) is 9.66%, exactly the value

from our Character Statistics. The first letter, the Shin ש, is given a probability of one (1), because we knew that 1,397 Shins existed in this range of the document we were searching.

The cumulative probabilities of each subsequent letter in the the search term sequence get smaller and smaller as we multiply the previous cumulative probability by the chance of finding that exact letter of the search term in the next pull out of the hat. Each additional pull of a letter is considered another independent event, mutually exclusive of the preceding events, but they all have to happen in this precise order to find a result exactly matching the search term.

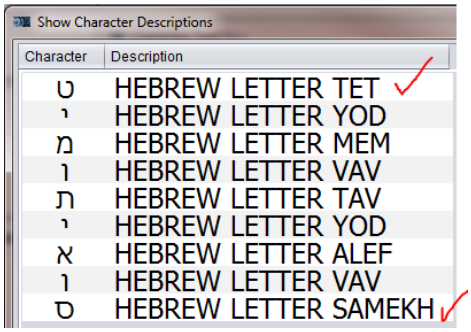
What is readily apparent by viewing the statistics in *Research Mode* is that you can see how the length of a search term factors into the final likelihood of that search term being found in the ancient manuscript by random chance. The longer that search term is, the less likely it should be found.

The letters that compose that search term are also critical. If the search term possesses characters that by their own nature are very rare in the document, the odds of finding that search term will also be low, and often heavily driven by the individual probability of the rare characters (depending on the order of the character in the letter sequence). For example, the Tet 'ט' , has the lowest number of occurrences in the Traditional Tanakh, appearing only 6,309 times, or 0.53%. The Samekh, 'ס' is the second least found character in the Tanakh, at 7,634 occurrences, or 0.64%.

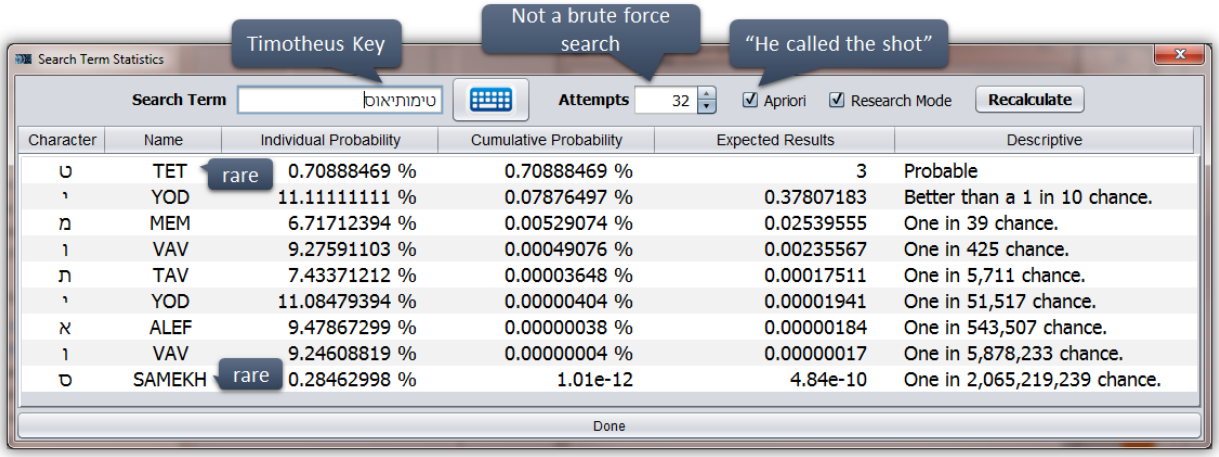


If you then compare the famous Timotheus Key, 'טימותיאוס', notice that it actually has both of these most rare characters. You can also see how these characters drive the probability of this search term very low. Based on the discoverer's story that he "called the shot" in advance, the

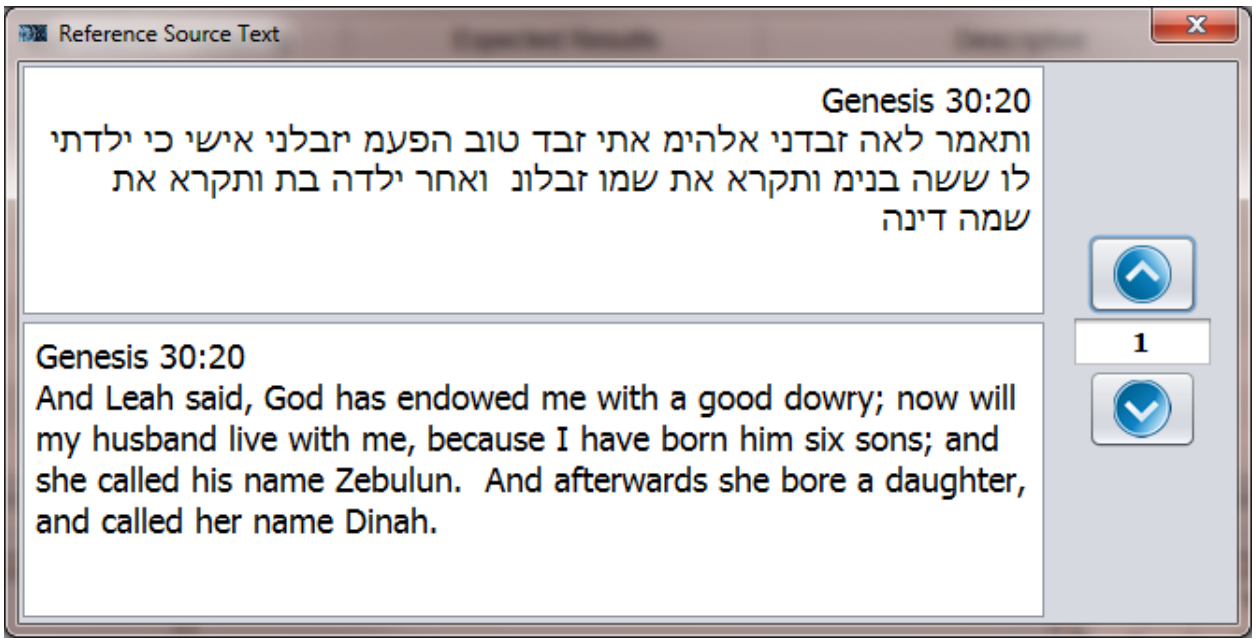
result is driven by both the rare letters of the search term and the *apriori* nature of the find.



According to the story in CK, the author did not have the benefit of an automated tool for searching the key at the time of discovery, so he was limited to the number of skips he could test in a particular section of the Leningrad Codex. Here is what the numbers look like in that case where we assume he was willing to search both forward and reverse for *Timotheus*.

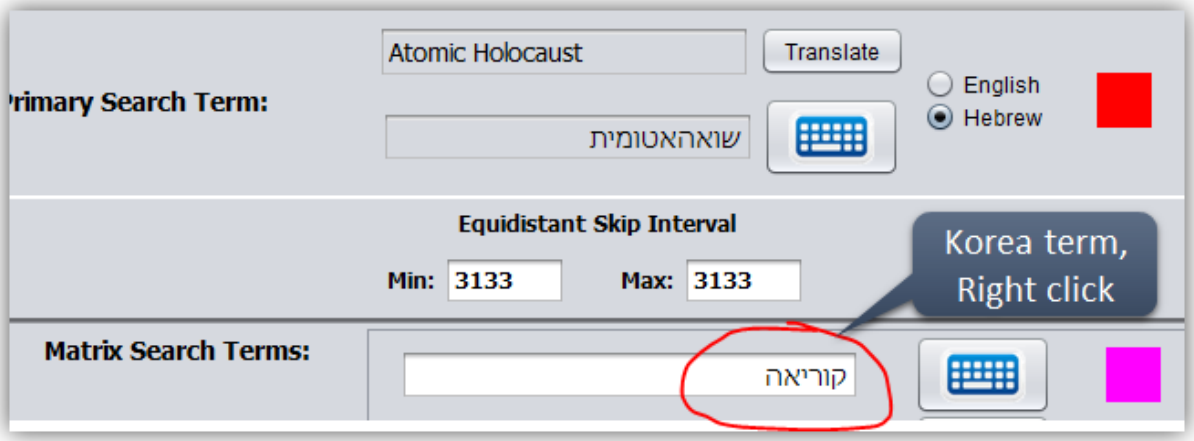


As can be seen, his chances of finding Timotheus were one on over two billion. If you then factor that find with context of the biographical data that pertained to himself having six sons and a daughter, being in a family of six sons and a daughter, the odds go to about one in a sextillionth (a one followed by 21 zeros, 10^{21}). We consider that a "phenomenal" result, i.e., we can't explain it by the possibility of random chance.

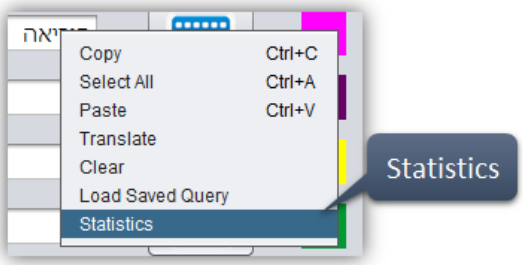


14.4 Finishing The Use Case

Now, lets return to the original "Atomic Holocaust Korean" use case, and finish our final analysis of this very strange result. We need to evaluate the term Korea (קוריאה) under the conditions of the reduced document range and only performing searches at one length (3133). Since we are willing to look for the term either vertical, horizontal, and diagonal, our *Attempts* is based on our step range of those algorithms. You can have STAR figure this out for you automatically. From the Search Pane, change your range to go from 3133 to 3133, and right click on your Korea Matrix Search Term as shown.



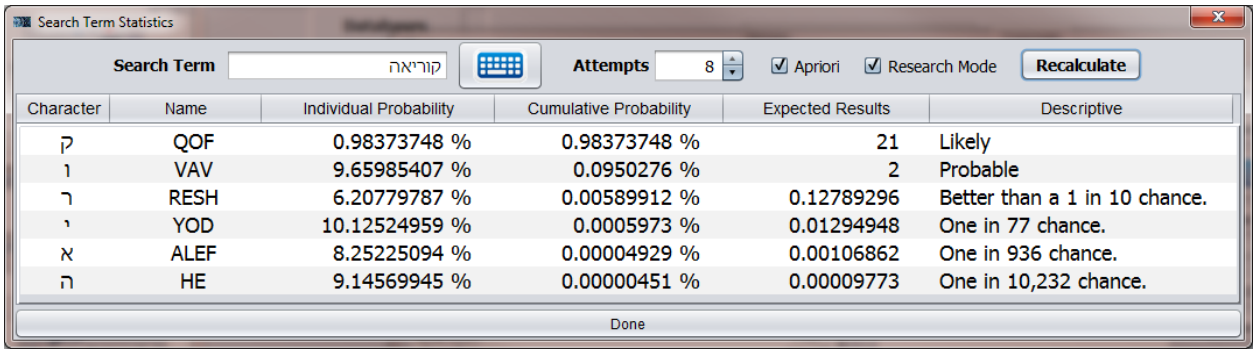
Now select Statistics from the popup menu to launch the Search Term Statistics Dialog as shown in the snap below.



With vertical, horizontal, and diagonal, we need to factor an attempt for every possible length. Each diagonal provides an attempt at unique EDLS length for each step, so our attempts here should be a total of 8 based on those algorithm settings:

- Vertical (forward and reverse, one length at 3133): 2 Attempts
- Horizontal (forward and reverse, one length of 1): 2 Attempts
- Diagonal (forward/reverse, 2 steps): 4 Attempts

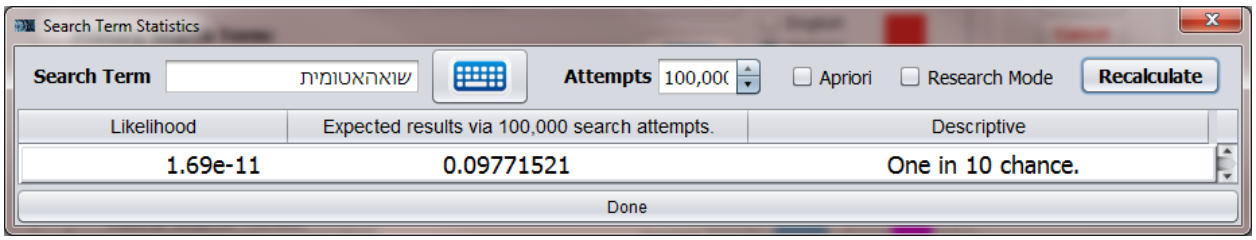
Total: **8 Attempts**



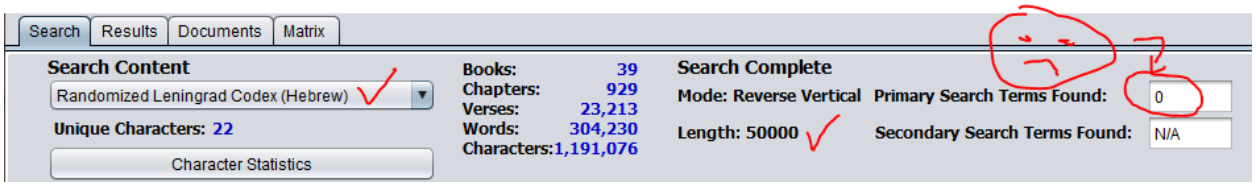
Character	Name	Individual Probability	Cumulative Probability	Expected Results	Descriptive
ק	QOF	0.98373748 %	0.98373748 %	21	Likely
ו	VAV	9.65985407 %	0.0950276 %	2	Probable
ר	RESH	6.20779787 %	0.00589912 %	0.12789296	Better than a 1 in 10 chance.
י	YOD	10.12524959 %	0.0005973 %	0.01294948	One in 77 chance.
א	ALEF	8.25225094 %	0.00004929 %	0.00106862	One in 936 chance.
ה	HE	9.14569945 %	0.00000451 %	0.00009773	One in 10,232 chance.

This makes for a very interesting result. Given these search conditions, there is only one (1) in a 10,232 chance of this search term showing up in that section of the text given the apriori conditions that you went looking for it there.

One final sanity check that we always like to perform on an unusual result like this is to run the same query against the *Randomized Leningrad Codex* letter sequence. Just for grins, we ran the "Atomic Holocaust" search term from an EDLS skip range of one (1) to 50,000. The Statistics tool indicates "One in 10 chance", so just maybe, we might actually get a hit in 100,000 random attempts.



Unfortunately, no joy here, but tools like this can help you be the judge when the community tosses out strange findings such as this one.

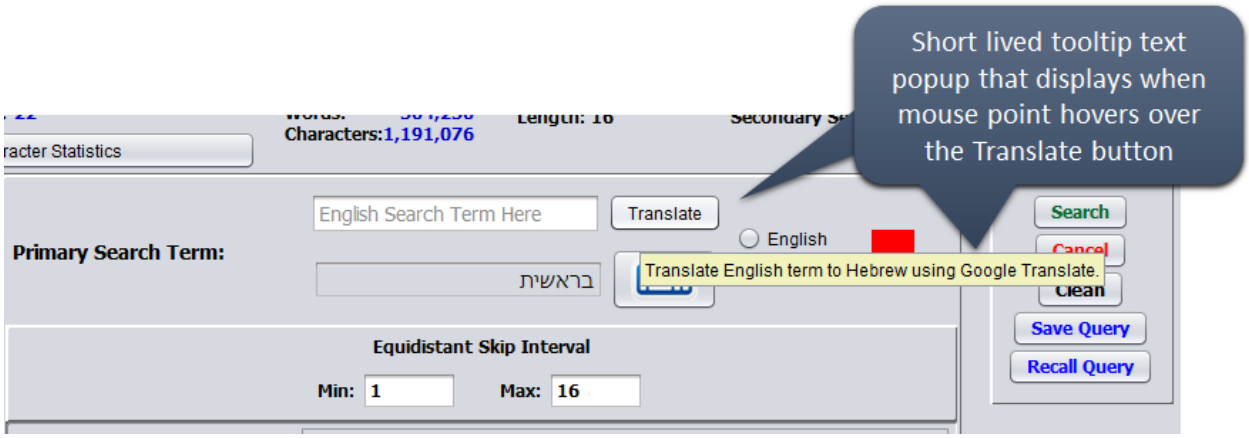


15 References

16 Help

16.1 Tooltips

We have attempted to be generous with tooltip texts that pop up throughout the STAR GUI that explain the intended function of a control or input field. A tooltip popup will display for about two seconds.

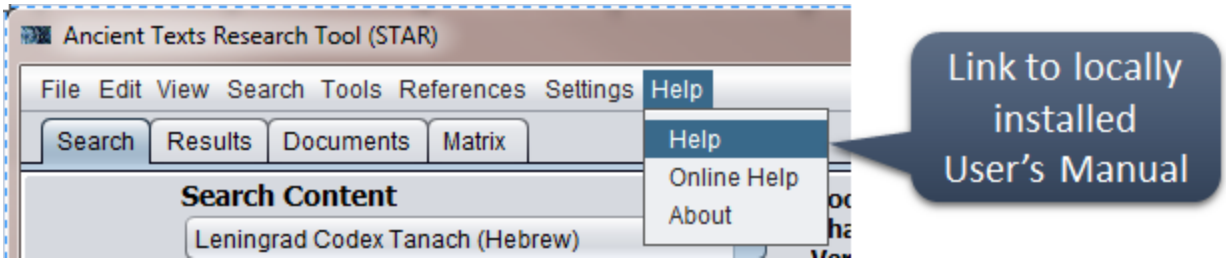


16.2 Help Menu

The Help Menu provides several features, the most important being a local reference to this User Manual, and an online reference to it.

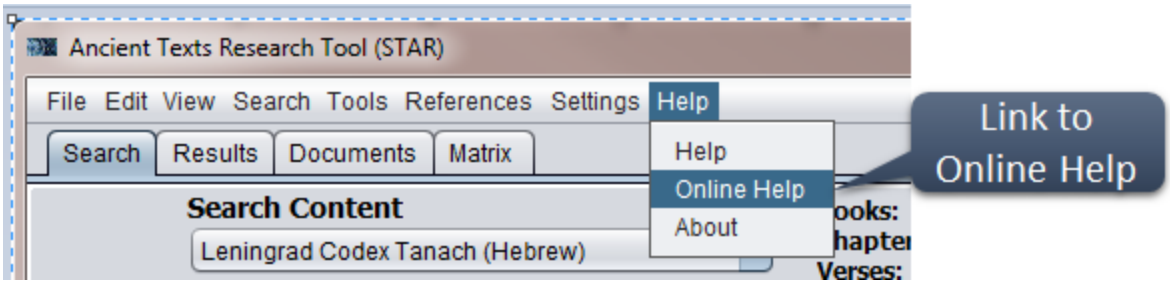
16.2.1 Local Help

The Help ⇒ User Manual options provides a link to the local copy of this User Manual installed with STAR. For the most recent copy of the User Manual, please refer to Online Help.



16.2.2 Online Help

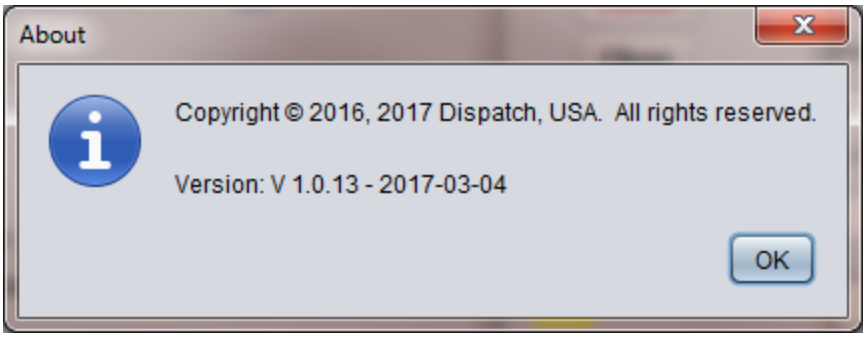
The Online Help menu item takes you to our website with the latest version of this manual.



You will find a host of other resources on our website to help you, especially a Frequently Asked Questions (FAQ) page assembled from comments and questions from the community. Based on these questions and comments, expect that the User Manual will be updated with recommended clarifications.

16.2.3 About

The *About* menu-item option under Help is where you can find details regarding the version of STAR that is installed on your machine.



16.2.4 Corrections

If you have corrections that you would like to report to us, please email them to corrections@AncientTextsResearch.org. We would greatly appreciate your feedback in our attempt to make this tool as valuable to the community as possible.

17 Lexicon

Coming in a future release.

18 Numbers

Coming in a future release.

19 Settings and Preferences

20 Glossary of Terms

App Application, i.e., a software app like STAR

Character A symbol within a particular languages alphabet. We've shied away from the use of the term "letter" for this, but we are speaking of the same thing. Our use of the term "character" to describe the symbol models the underlying data definitions in software language (i.e., Java).

Decryption Information, typically some form of communication, previously encrypted, that has been re-reconstructed back to its original coherent form

EDLS Equidistant Letter Sequence

GUI Graphical User Interface, sometimes also referred to as a User Interface (UI)

Key Code Legacy terminology for what we call a "Search Term"

Letter We have attempted to avoid this term in lieu of the term "character". See its definition above.

Letter Sequence Sometimes referred to as the letter sequence array , this encompasses all of the individual characters of a search document assembled in a perfectly ordered sequential array. For Hebrew documents, the letter sequence is cleansed (e.g., filtered) to 22 unique consonants.

Overt Text The original readable text in its natural ordering of letters, words, verses, etc.

Query Defines all the parameters that compose a search, which includes the primary and secondary search terms, type of search (e.g., EDLS, DNA, etc.) document range, EDLS skip settings, and other search algorithm settings (e.g., diagonal search).

Search Term a sequence of letters, typically a word, that is searched for in a letter sequence (we've adopted this industry standard term to be coincident with how you would also search on the internet, e.g., a Google search)

Session Defines the period of time from which you start up STAR until the time you shut it down.

Snap A screen snapshot. May also be a snapshot of a dialogue popup, etc..

Synchronicity Signatures that produce patterns that are not formed naturally. In the context of STAR, when search results are found outside the norm of the statistics based on the random distribution of characters, and that result aligns with independent data outside of the tool (e.g., biographic data of a person), we suggest the that the result shows synchronicity (i.e., it was not formed by random chance). See CK for a more elaborate description.