


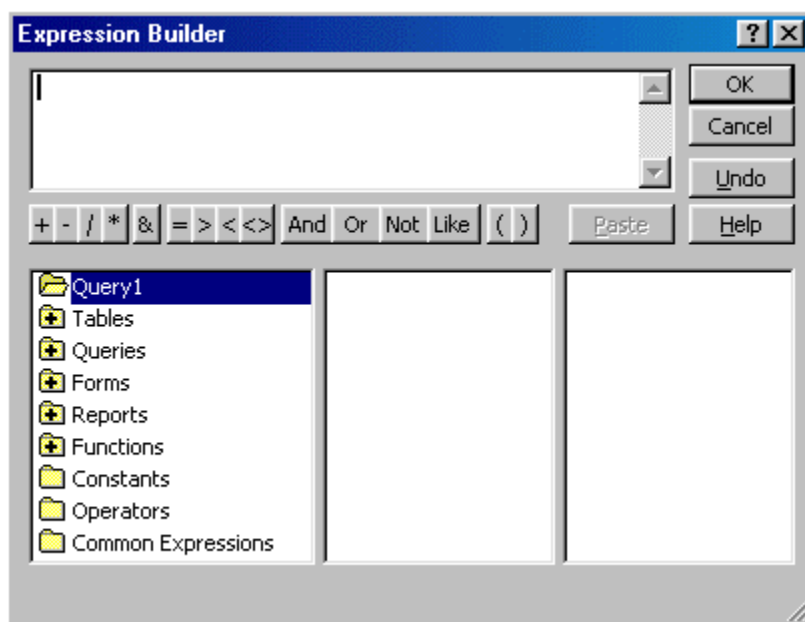
## Creating Calculated Fields in *Access* Queries and Reports

*Access 2000* has a tool called the **Expression Builder** that makes it relatively easy to create new fields that calculate other existing numeric fields in your database. For example, if you have existing fields called **Sales in 1999** and **Sales in 2000**, you can add the two together in a query or a report using the Expression Builder.

### Using Expression Builder in Queries

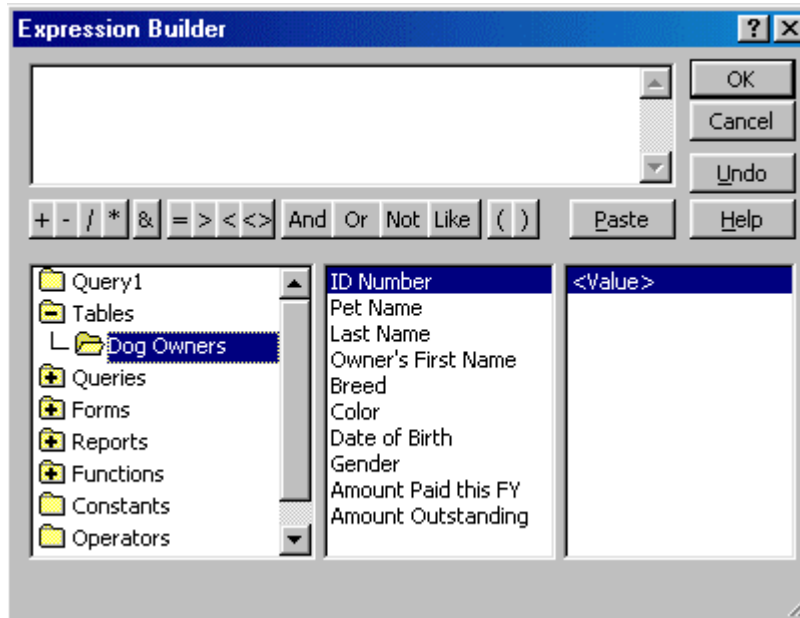
First, get into the QBE (design view) of a new query as you normally would. For this example, we will use a database for a fictitious "dog-sitting" parlor. The database contains the dog's name, owner's first and last name, breed of the dog, and the amount paid so far this fiscal year and the amount outstanding. For this query, we will display the owner's last name, owner's first name, amount paid, and amount outstanding, and then a calculated field that adds the last two together.

To create a new field that adds the amount paid to the amount outstanding, place your cursor in the next column to the right, then click on the icon that looks like the magic wand on the *Access* toolbar: . This will open up a dialog box called the **Expression Builder**:

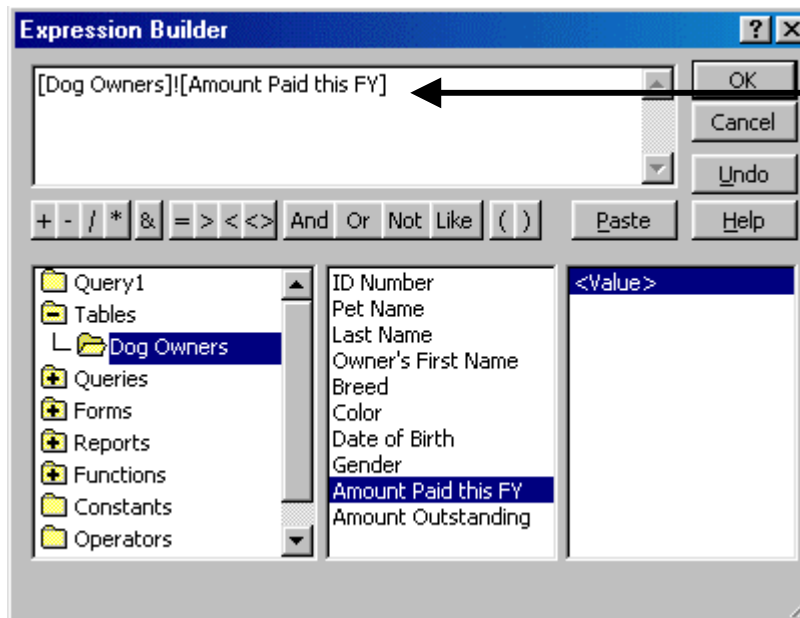


Basically, you want to double-click on the item you want to build the expression from within the far left window (in this case, an *Access* table) to reveal a list of all fields in that table in the middle window.

Since we want to add two fields together from an *Access* table, double-click on the **Tables** folder in the left window to reveal a list of all tables in the database. In this case, we just have one table, called **Dog Owners**. Double-click on the **Dog Owners** table name, to show a list of all fields in that table. When done, the Expression Builder should look like this:

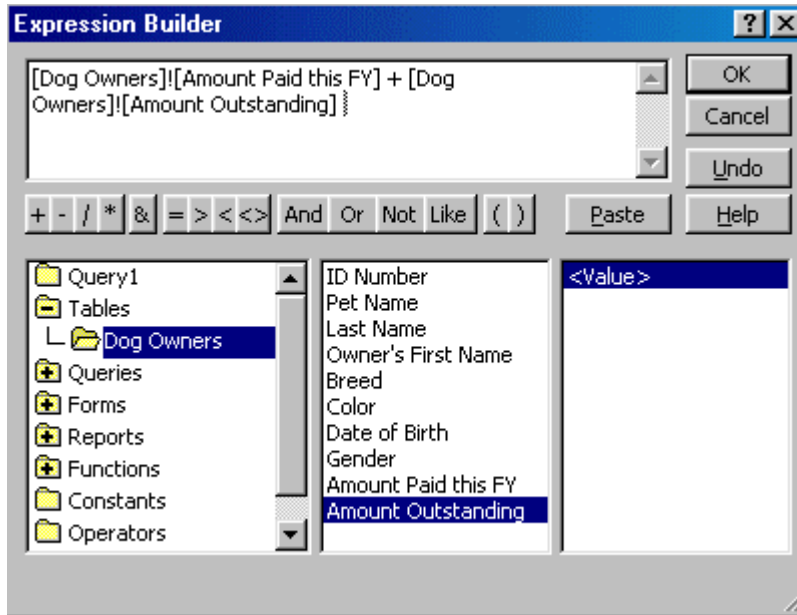


Notice underneath the Expression Builder's main window are various buttons for adding, subtracting, multiplying, etc. We want to add together the **Amount Paid this FY** to the **Amount Outstanding**. Therefore, we first double-click on the field named **Amount Paid this FY**, so that it appears in the Expression Builder window:

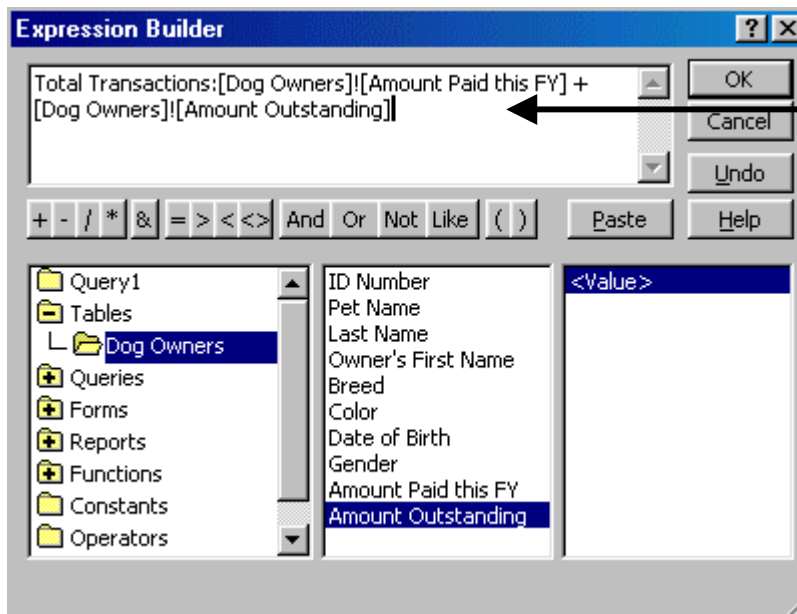


The Expression Builder window displays field names by first giving the table name (in this case, Dog Owners) followed by an exclamation point and the specific field name from within that table.

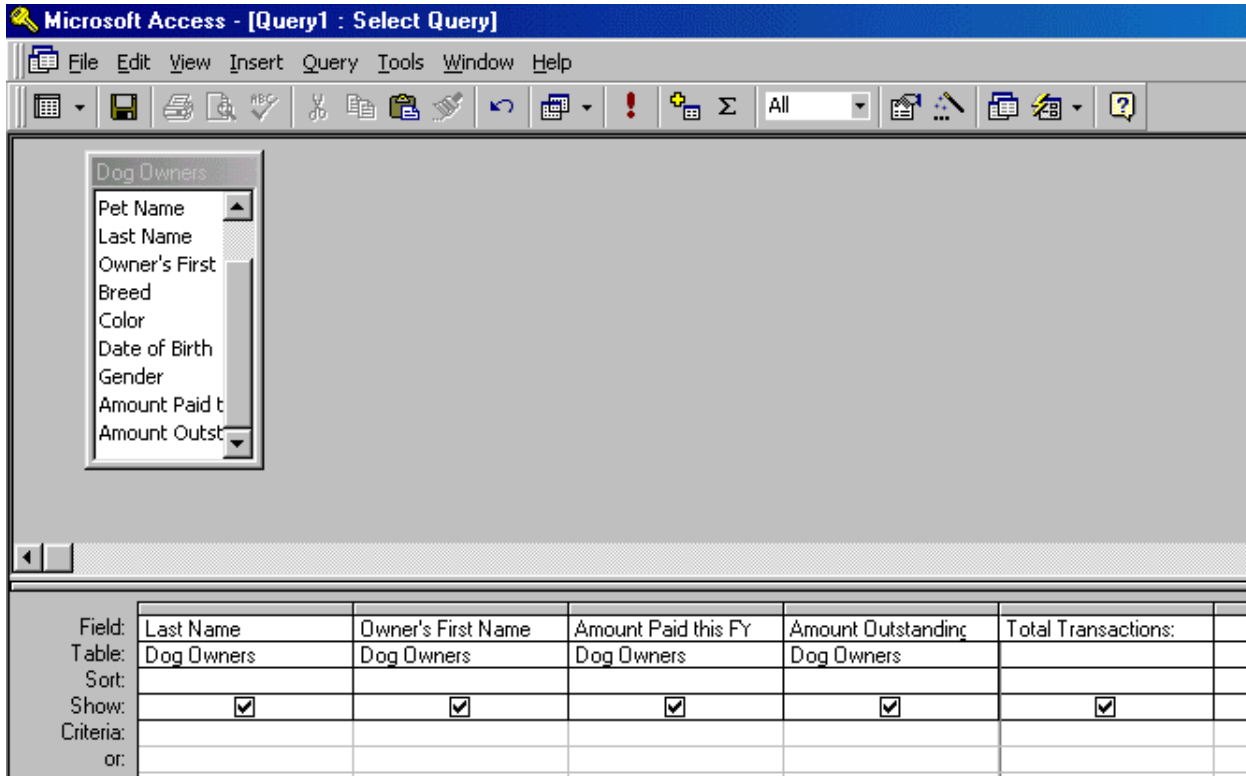
Next, it is a matter of building our formula by clicking on the **plus sign** button, and finally double-clicking on the field name we want to add to our formula--namely, the Amount Outstanding field. When completed, our Expression Builder window should look like this:



Before clicking **OK**, though, there's one more step. We need to create a field name for our newly invented *Access* query. If we don't, it will have the rather nondescript name of **Expr1** on our query. So, to insert a field name, click just *before* everything else in the Expression Builder window, and type a field name of your choice, followed by a colon. In this case, we'll call it **Total Transactions**. Here's what the Expression Builder window now looks like:



Now, when we click **OK**, our new field will be displayed in the QBE window, so that is looks like what we see below. Also, when we actually *run* the query, it will appear as a column with the correct name. Best of all, when we save this query, this newly created field can appear on any future *Access* reports we do.



## Using Expression Builder in Reports

We can use a similar method when creating a field in an *Access* report. In this case, let's display the **Average Total Transactions** for everyone in our database on a report, using the new field we just used in our previous query. We can create our initial report using the query we already saved by using the Report Wizard in *Access*. When creating the report, we make sure to specify a **Grouping Level**, using Breeds as the grouping. This is necessary (as explained on the *Using Access 2000* handout) if we want to have summary data such as averages, totals, etc., appear for various fields on our report. But even after clicking the **Summary Options** button during the report creation and specifying **Average** for our Total Transactions field, it will only display the average *within each grouping level* (in this case, breed), and NOT for the entire database.

Note, for example, the second page of our report after creating it with the Report Wizard, using our previously created query that included a new field called Total Transactions:


Breed	Last Name of Owner	Owner's First Name	Amount Paid this FY	Amount Outstanding	Total Transactions
Summary for Breed = Labrador Retriever (2 detail records)					
Avg					57.5
Rottweiler					
	Miller	Cheryl	\$30.00	\$15.00	\$45.00
	Pfeiffer	Dedee	\$30.00	\$10.00	\$40.00
	Smith	Will	\$10.00	\$0.00	\$10.00
	Smith	Will	\$65.00	\$20.00	\$75.00
Summary for Breed = Rottweiler (4 detail records)					
Avg					42.5
Schnauzer					
	Grant				\$45.00
					\$65.00
Summary for Breed = Schnauzer (2 detail records)					
Avg					55

Our newly created average field does not display in the currency format (\$), but that is easily solved, and is explained at the end of this handout.

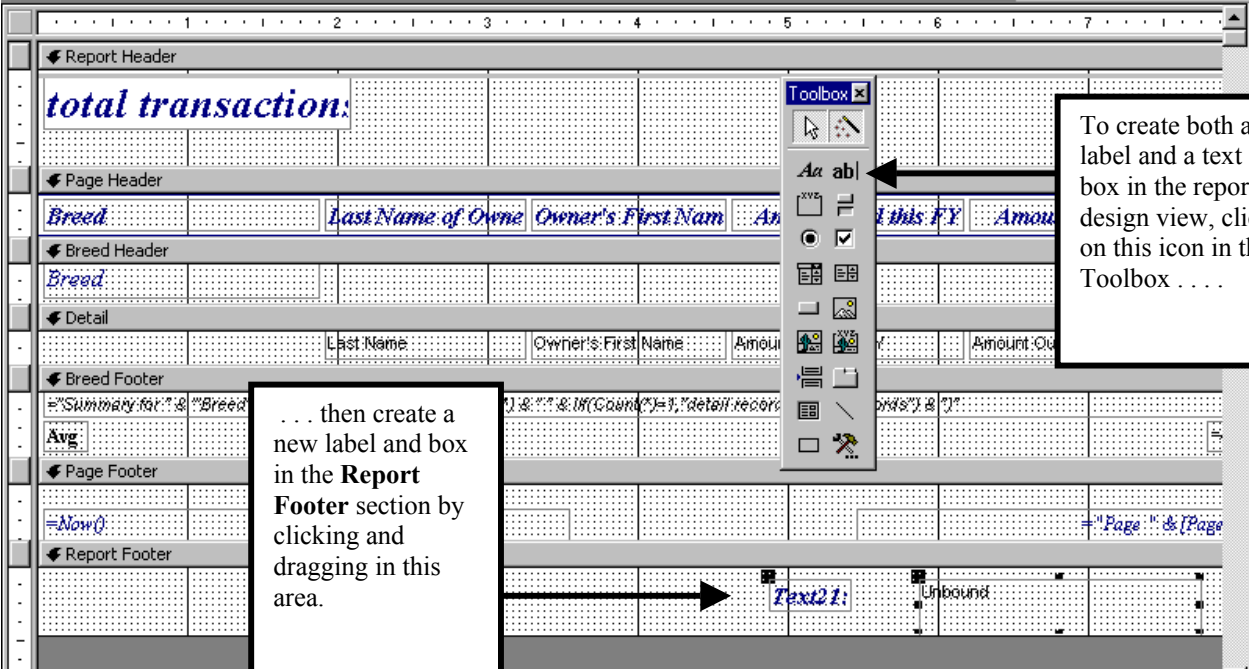
The average is displayed within each grouping (dog breed), but not for *all* records as a whole in the database.

Notice average appears within each grouping (dog breed), but not for *all* records as a whole.

Notice on the report above the average (**Avg**) is displayed at the end of each breed in the "Summary for Breed" section of the report, but there is no average shown at the bottom of the report for *all* clients, averaged together.

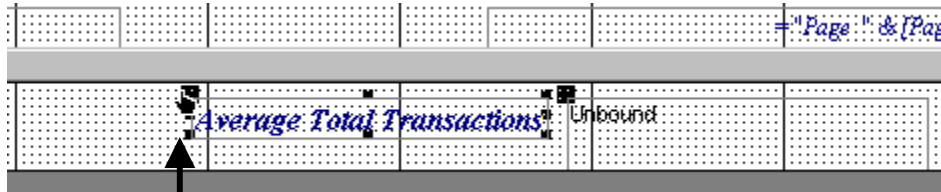
To do this, we have to create a new text box on the Report in the design view, and build an expression. So first, with the report preview on the screen, we click the Design View button on the toolbar: . The new field we want to add should be at the bottom of the report, so we have to add it in the section called **Report Footer**. Make sure you have the toolbox in the design view (click **View** pull-down menu, then **Toolbox** if you don't), then click on the **Text Box** icon (the lower case **ab** letters in the toolbox) and click and drag a small rectangle in the **Report Footer** section. (Don't worry that the Report Footer section is gray--it won't be once you create the boxes.) Notice that when you select the **Text Box** icon in the toolbox that both a label and a box are created.

Here is what our report now looks like in design view:



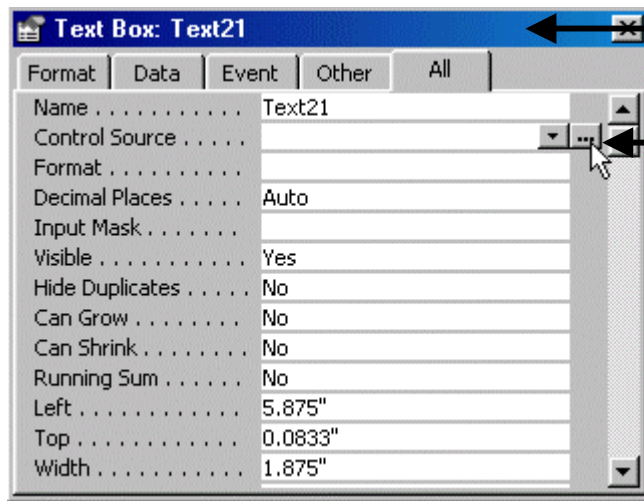
The screenshot shows the Report Design View interface. The Report Footer section is highlighted in gray. A new text box, labeled "Text21", is being added to the footer. The Toolbox is open, showing the "Text Box" icon (lowercase "ab") selected. A callout box points to this icon with the text: "To create both a label and a text box in the report design view, click on this icon in the Toolbox . . .". Another callout box points to the text box in the footer with the text: ". . . then create a new label and box in the **Report Footer** section by clicking and dragging in this area."

To get the easy part out of the way first and change the label, just click in the box labeled **Text21** in bold face type, and type in the label that will appear in this report. We'll call it **Average Total Transactions**. Here's what it will look like after typing it, and after we re-size the text box a little bit and move it out of the way:



To move a box in the design view of *Access*, make sure the mouse pointer first looks like a pointing finger near the square-shaped icon in the corner (as shown), *then* click and drag it.

Now, we have to do something about the newly created text box that says **Unbound** in our report. We want it to show the average of all Total Transactions. First, select the box with the mouse, and click the **View** pull-down menu, then **Properties**. (Alternatively, *right-click* in the box, then select **Properties** from the resulting menu.) The **Properties** dialog box should come up, as shown below. *Make sure the Properties dialog box title bar shows Text Box at the top of it, or else you may be editing the wrong box!* Next, with either the **All** tab or the **Data** tab enabled at the top of this box, click your mouse in the window labeled **Control Source** so that a little box with three dots appears next to it:

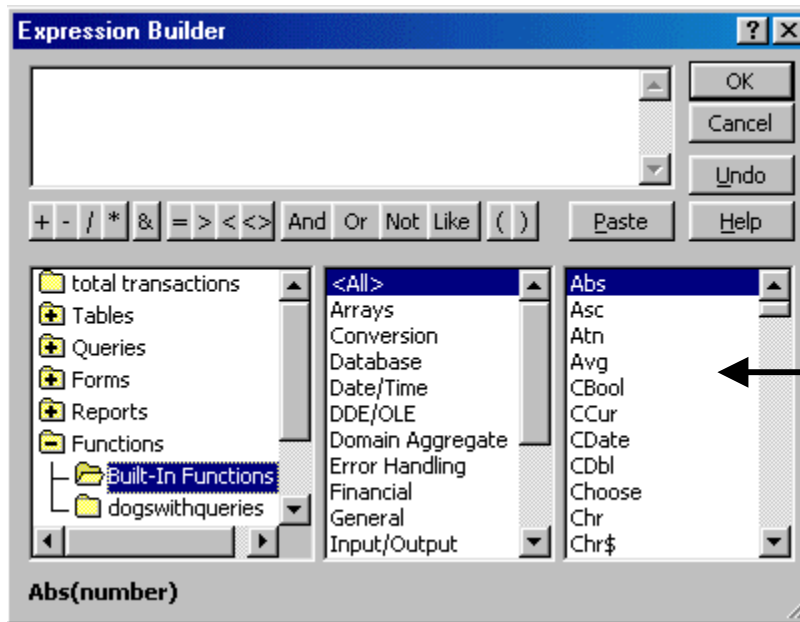


Make sure you're in the right text box, and also that you're not editing a label!

This is the button you will be clicking to bring up the Expression Builder

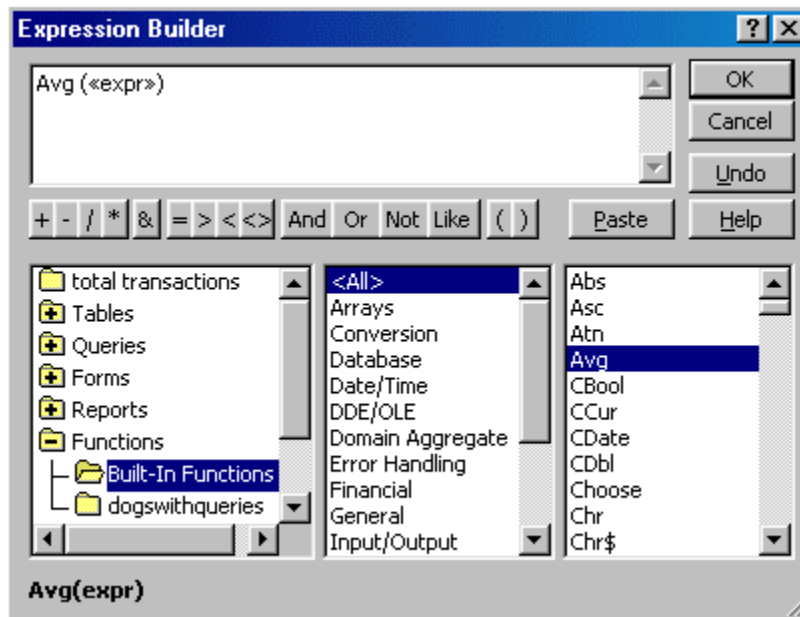
After clicking that three-dotted box, it will bring up the Expression Builder window.

Unlike last time with our query, however, we'll have to do things a little differently in the Expression Builder. Because averaging a field is considered a function (similar to the Average function within *Excel*), this time we want to double-click in the left-side window of the Expression Builder to select the **FUNCTIONS** folder label, and then the folder that appears underneath that called **Built-In-Functions**. This will bring up the following window:

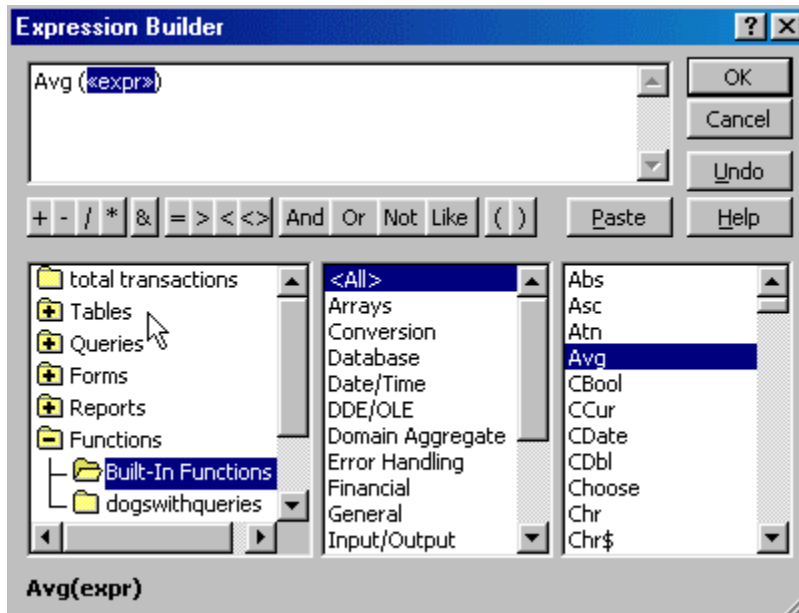


After double-clicking on the **Functions** folder, then the **Built-In Functions** folder on the far left, you'll see a listing of functions arranged by type of function (the middle window), and the name of the function on the far right. If you've ever created a function in *Excel* this dialog box looks somewhat similar.

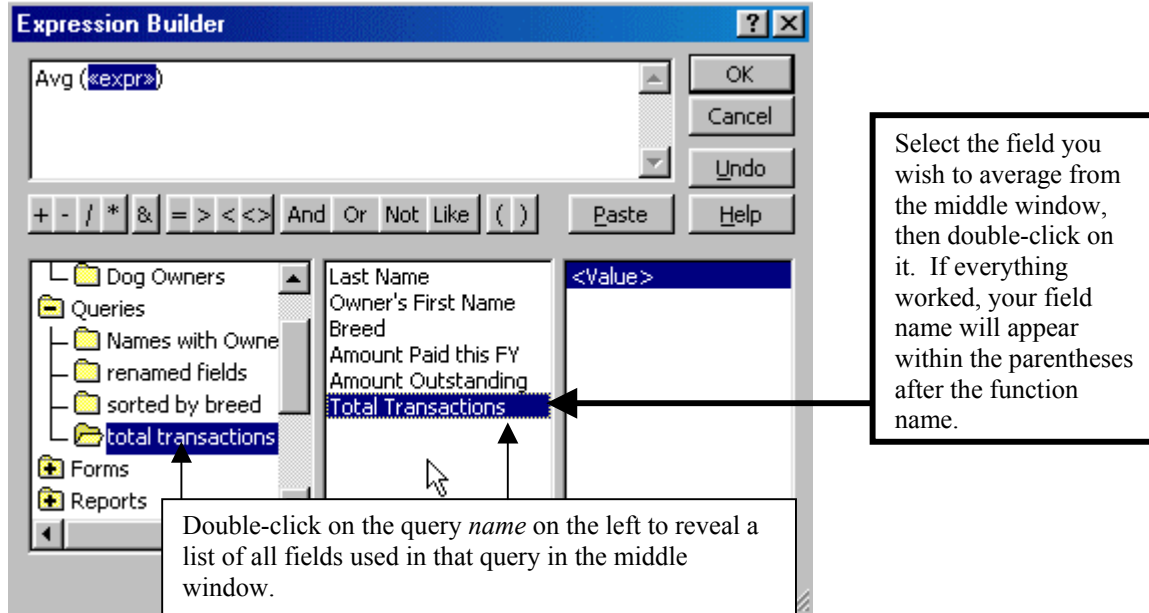
At this point, it's similar to creating a function within *Excel*--the function name appears followed by parentheses, with the parentheses containing the item(s) we want the function to act upon. You can spot the function name we want in the window on the far right--it's called **Avg**. Double click on it to see the following:



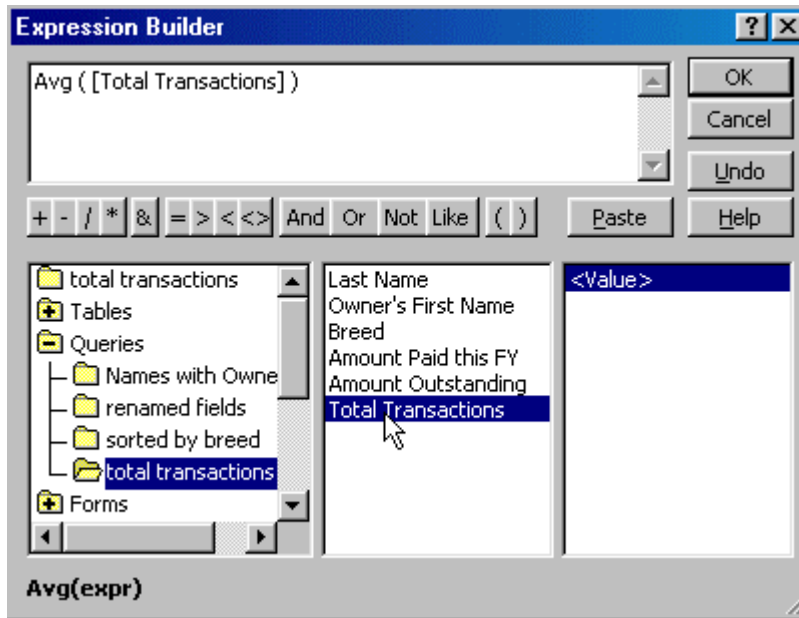
Now, we need to select the field we wish to average. Notice that in the window above the function name **Avg** is followed by: (<<expr>>). We want to place our field name *within* those parentheses. The quickest way to do this is double-click within the parentheses so that the text within them is selected:



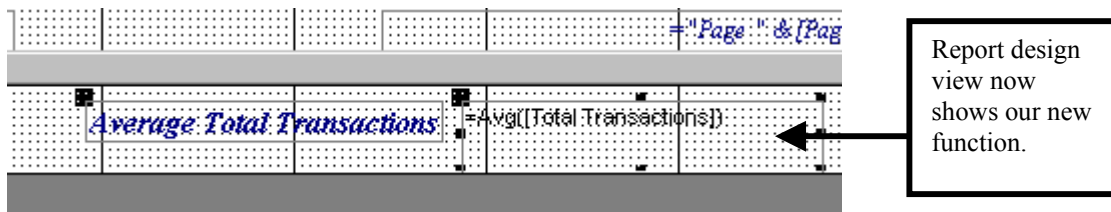
Next, leaving that text in the window selected, double-click on the folder name in the left window that contains the field we want to average. In this case, it will be in the **Queries** folder, since the Total Transactions field is one that was created for a query. After double-clicking on the **Queries** folder, double-click on the query name (the name you saved your query under):



Finally, double click on the field within the query that is listed in the middle window. Here is what the end result should look like:



Notice the field name is now correctly within the parentheses after the function name. After clicking **OK** you will be back in the design view of the report at the Properties window. Close the Properties window, and your report design should now reflect your newly created field:

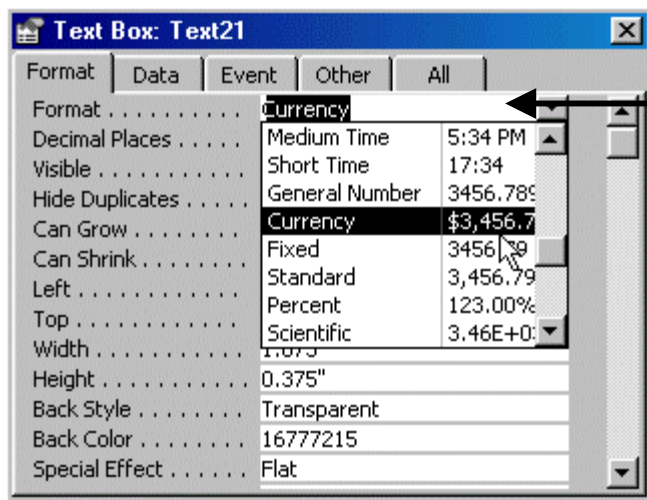


Click the **Print Preview** button to see if everything looks okay. Advance the "page" until you get to the last page of the report (remember, we did this in the **Report Footer** section in the design view--which means at the bottom of the Report):

Breed	Last Name of Owner	Owner's First Name	Amount Paid this FY	Amount Outstanding	Total Transactions
<i>Summary for 'Breed' = Labrador Retriever (2 detail records)</i>					
<b>Avg</b>					
<i>Rottweiler</i>					
	Miller	Cheryl	\$30.00	\$15.00	\$45.00
	Pfeiffer	Dedee	\$30.00	\$10.00	\$40.00
	Smith	Will	\$10.00	\$0.00	\$10.00
	Smith	Will	\$55.00	\$20.00	\$75.00
<i>Summary for 'Breed' = Rottweiler (4 detail records)</i>					
<b>Avg</b>					
<i>Schnauzer</i>					
	Grant	Amy	\$20.00	\$25.00	\$45.00
	Grant	Amy	\$45.00	\$20.00	\$65.00
<i>Summary for 'Breed' = Schnauzer (2 detail records)</i>					
<b>Avg</b>					
				Average Total Transactions:	46.7857

Here is our newly created label and text box in the report.

Notice, however, that our new field is not properly formatted in the currency format. (Neither, for that matter, are the other average figures we put in the report based on our earlier query). Fortunately, that's easily solved by going back into design view, clicking in the proper text box and going back to the Properties box as discussed earlier. In the Properties dialog box, click on the **Format** tab, then click on the drop-down arrow that appears next to the Format window. Here, you just click **Currency**, and that will take care of it:



Click here in the **Properties** box to ensure that your field is displaying in the format you want it to.

Be sure to do this both for our newly created field in the Report and also within the **Detail** section of the Report in the design view to have the average field display as currency.