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A Simple Microsoft Access Application for Capturing Metadata on Geological Reports held by the Afghan Geological Survey

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Keywords

Report; metadata; application; languages; Microsoft Access; Afghan Geological Survey.

Front cover

Two Afghan Geological Survey staff using the metadata capture application in the AGS building, Kabul, under the direction of the author.

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Foreword

This report describes a Microsoft Access ™ application developed by the author whilst working on the BGS International Commercial Project "Afghanistan Institutional Strengthening". This application has been used with great success to capture metadata about the geological reports and other documents held by the Afghan Geological Survey.

Acknowledgements

Advice was provided during the development of this application by SJ Coats and RP McIntosh, BGS. The first draft of this report was read and commented on by AC MacKenzie, BGS.

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Summary

This report describes a Microsoft Access ™ application that was developed by the author and used during the course of the BGS International Commercial project “Afghanistan Institutional Strengthening”, 2004-2007. The purpose of this application is to provide a method for staff of the Afghanistan Geological Survey (AGS) to record simple metadata describing the documents held by that organisation. Requirements for this application included the ability to record titles and authors’ names in several languages. It was necessary that the application be simple enough to be used by people with very limited knowledge of computers, and whose first language is not English.

The metadata recorded using this application were subsequently harvested, validated, and used to populate a web database of metadata describing the reports and other documents held by the AGS. This database is available for search on the AGS website at http://www.bgs.ac.uk/AfghanMinerals/ (October 2008).

In this report, Section 1 describes the context of this work and explains why this application was necessary. The formal requirements of the application are also set out. Section 2 describes the database, or "back-end", part of the application. Section 3 describes the user interface, or "front-end", part of the application. In Section 4, the workflow that was developed for recording the metadata is described. Some concluding remarks are given in Section 5. The guide that the author prepared for users of the application is presented as an appendix. A glossary, tables and figures complete the report.

1 Introduction

One of the deliverables from the BGS International Commercial project "Afghanistan Institutional Strengthening" is an online database of metadata describing the paper documents held by the Afghanistan Geological Survey (AGS). There are about 2500 of these documents, stored in an archive in the AGS headquarters in Kabul. Some of these are internal documents written by AGS staff. Some are copies of reports relating to Afghan geology or the AGS itself produced by other organisations and lodged with the AGS. There are also copies of publications produced by other organisations. Most are written in Russian and/or Dari, one of the two official languages of Afghanistan (the other being Pashto). There are a few in other languages: German, Italian, French, and English are represented. Taken together, the reports cover the whole spectrum of survey activities, from geophysical and mapping surveys to financial administration (Figure 1).

The online database stores a range of metadata describing these documents, including title (in both English and Dari, as well as the native language of the report if this is different, for example Russian), authors' names, year of authorship, storage location, and descriptions of included items such as maps, cross sections and graphic logs. The database also maintains links to digital copies of key documents. It is possible to query this database on the AGS website at http://www.bgs.ac.uk/AfghanMinerals.

It was decided by the project archivist RP McIntosh and the author that initially, inventory numbers, titles, authors' names and year of authorship would be recorded to build a "first pass" database. Collection of additional metadata, such as numbers of parts and pages and descriptions of included maps and other items, would be left to a later "second pass" possibly to be carried out entirely by Afghan staff. This is not dealt with in this report.

BGS staff and sub-contractors were able to record and translate titles and authors' names in several languages including English, Russian, French, German, and Italian. However it was clear from the outset that the project would rely on Afghan staff to type metadata in Dari, and translate it into English. To facilitate this, the author developed a simple software application, using Microsoft Access, which AGS staff could use to key in metadata in whichever language was required. This application stored the metadata on a networked file server, from where it could subsequently be collected, validated, and used to populate the final online database.

Training Afghan counterparts in the use of this application, and in accurate keying of metadata, helped to further one of the main aims of the project, which is to transfer skills to AGS staff.

1.1 THE TASK

The task faced by the project team and their Afghan counterparts was to assign a unique inventory number to each document in the archive, and to record its title, year of authorship, and the names of the authors. Title and authors' names were to be recorded in both English and Dari. In addition, where the language of the document was not English or Dari, title and authors' names were to be recorded in the original language for bibliographical completeness.

Project sub-contractors Peter Kovac, Igor Rojkovic and Rasto Vojtko from Slovakia were able to provide English translations of titles and authors for the documents written in Russian, and other team members were able to translate from other European languages. However all keying, and translation to and from, Dari had to be done by AGS counterparts.

One aspect that made development of this application an interesting proposition was that Russian is typed using the Cyrillic alphabet, while Dari uses the Farsi (Persian) alphabet and is typed from right-to-left. The metadata capture strategy needed to take account of these facts.

1.2 FORMAL REQUIREMENTS

The requirements for the metadata capture application may be formally stated as follows:

1) It must be possible to store an inventory number, a title, names of one or more authors, year of authorship, and additional comments for each document.

2) It must be possible to input the title in Dari, English, and if necessary in some other language (the native language of the document) at the same time.

3) It must be possible to input the authors' names using the Farsi, English, and (if necessary) Cyrillic alphabets at the same time.

4) It must be possible for several users to use the application at the same time on different computers, but the data should be stored on a file server so that all users have access to the same data. The application must manage

conflicts that arise, for example, as the result of more than one user attempting to edit the same record at the same time.

5) The application must be simple to learn and use, so that people with very limited computer experience and/or English proficiency can use it.

6) The application must be robust enough to continue to operate correctly when the BGS staff who are able to maintain it are not present in Afghanistan.

1.3 THE IT ARCHITECTURE

BGS have installed a number of networked Dell PCs running the Microsoft Windows XP ™ operating system, and a networked file server running the Microsoft Windows Server 2003 ™ operating system in the AGS building. This makes it possible to run client-server applications that consist of a "back-end" database application residing on the file server, communicating with a "front-end" or "client" user interface application that may be installed on several networked PCs (Figure 2). The advantage of this approach over using entirely separate applications installed on each PC is that the same data are available to any PC where the client software is installed. Appropriate file access privileges can be set for the users on the file server, enabling them to work with the data but preventing them from accidentally deleting the database!

2 The Database Application

2.1 DATABASE

The purpose of the database application is to store the metadata in a secure location where it is available to each of the client user interface applications (Figure 2). There is only one copy of this file, installed on the networked file server. Because the purpose of this file is just to store data, it has no forms or other user interface components. It just contains the tables necessary to store the metadata.

For each document, the application needs to be able to store an inventory number, year of authorship, title (in English, Dari and, if necessary, a third language), comments (in English and Dari), authors' names (using the English, Farsi and, if necessary, Cyrillic alphabets), and the language(s) the report was written in. For each document, there is only one inventory number, year of authorship, title, and comment (although the title and comments are expressed in more than one language). However, for each document, there may be one or more than one authors, and one or more than one language. For example there are many reports written in both Russian and Dari. A simple data model was developed to meet these requirements. It is shown in Figure 3. It consists of three tables:

1) `REPORT`: This holds one record for each document, and stores the inventory number, year of authorship, title, and comments.

2) `REPORT_AUTHOR`: This stores the names of the authors of a document. There may be none, one, or more than one author for a given document. `REPORT_AUTHOR` has a foreign key relationship with `REPORT`, the join being made through the shared `inventory_number` column.

3) `REPORT_LANGUAGE`: This stores the languages for a document. There may be one or more than one language for a given document. `REPORT_LANGUAGE` has a foreign key relationship with `REPORT`, the join being made through the shared `inventory_number` column.

The tables and their columns are described in detail in tables 1-3.

For purposes of this simple application, the identity of the user who entered each record is not recorded. This was not considered necessary, because this is not a production database application, just a tool for collecting metadata. However, the date and time at which each record is entered is recorded automatically as the record is inserted. There are two reasons for this. First, it allows for a simple check on the progress of the counterparts in inputting metadata. Second, in the case of `REPORT_AUTHOR` and `REPORT_LANGUAGE`, recording the date and time of data entry ensures that, for a given document, author names and languages can be reported in the order in which they were typed in. This is particularly important for authors' names because their quoted order is significant.

2.2 DATA VALIDATION AND RECORD LOCKING

Because the purpose of this application is simply to gather metadata, which will then go through a validation process before being imported into the web database that is the ultimate goal of this activity, this application provides very

little in the way of data validation apart from forcing the user to enter the correct metadata into the correct fields. Inventory number is constrained to be an integer. Names of languages are constrained by the select list built into the metadata entry form in the client user interface application (Section 3).

In order to prevent conflicts arising through more than one user attempting to edit the same record at the same time, record-level locking is used. This means that when one user begins to edit a record, all other users are prevented from editing the same record until the first user has finished and saved it.

2.3 LOCATION AND PERMISSIONS

The back-end database file is called "Report Data Input 14_02_2005_be", and is installed on the AGS networked file server BGSAFS003 at the following location: Archive\WorkingFiles\Data\.

General AGS users have "Read & Execute", "List Folder Contents" and "Read" permissions in this folder.

3 The Client Application

3.1 OVERVIEW

The purpose of the client is to provide the interface that users use to enter and edit metadata. It provides the following functionality:

1) A form for navigating, typing and editing metadata.
2) Table views of the metadata.
3) The ability to generate a report presenting metadata describing one or more AGS documents.

These options are accessed via menus.

3.2 APPLICATION STRUCTURE

The components that make up the client application are listed in Figure 4. They include queries, forms and sub forms, a report, a menu bar with menus, and a toolbar.

3.2.1 Queries

The heart of the application is three queries that provide the link between the client application and the back end database. These queries are:

1) `REPORT_Q1`: Retrieves all records and fields from the table `REPORT` in the database and sorts them by `inventory_number`.
2) `REPORT_AUTHOR_Q1`: Retrieves all records and fields from the table `REPORT_AUTHOR` and sorts them by `inventory_number`, then by `date_entered`. This ensures that the authors for a given document are shown in the same order in which they were typed. This is necessary for bibliographical purposes.
3) `REPORT_LANGUAGE_Q1`: Retrieves all records and fields from the table `REPORT_LANGUAGE` and sorts them by `inventory_number`, then by `date_entered`. This ensures that the languages for a given document are shown in the same order in which they were typed.

The forms and report that display the metadata use these three queries as their data source. In addition, when metadata are inserted, edited or deleted, the operation is performed through these queries.

3.2.2 Forms

The application uses three main forms, one of which uses two sub-forms in its construction. The forms and sub-forms are:

1) `FrmREPORT_Q1` (caption: "Enter Data"): This is the main data entry and editing form. Its data source is the query `REPORT_Q1`. The form has buttons for record navigation and data entry and editing operations. `FrmREPORT_Q1` uses within its construction two sub-forms:

i. SubfrmREPORT_AUTHOR_Q1 (no caption): This is a component on frmREPORT_Q1 that lists the authors of the currently selected document. Its data source is the query REPORT_AUTHOR_Q1.

ii. SubfrmREPORT_LANGUAGE_Q1 (no caption): This is a component on frmREPORT_Q1 that lists the languages of the currently selected document. Its data source is the query REPORT_LANGUAGE_Q1.

2) FrmRptREPORT_Q1 (caption: "Select Reports"): This is a modal form that allows the user to specify what range of document inventory numbers they want to appear on a generated report. It does not display data so it has no data source.

3) FrmAbout (caption: "About"): This is a modal form displaying brief information about the application, including the email address of the developer. It has no data source.

Use of these forms is described in Section 3.3 "Application Operation".

3.2.3 Report

The application includes one report, rptREPORT_Q1 (caption: "List of Reports"). This displays metadata from the database as a formatted report. This report can be printed out from the default printer by clicking on the associated "Print" button that appears at the same time as the report. More information on how to generate the report is given in Section 3.3 "Application Operation".

3.2.4 Menus and Toolbars

The menu bar is called reportDataEntry, and it holds four menus:

1) File: This menu has options for generating a printable report, and for exiting from the application. The menu items are:

   i. Make Report: This causes the form frmRptREPORT_Q1 to be displayed. The user uses this form to select the range of document inventory numbers they want to appear on a report, and then run the report (see "Application Operation" below).

   ii. Exit: Exits the application.

2) Edit: A standard edit menu, with the following menu items:

   i. Cut: Cuts any selected text and places it on the clipboard.

   ii. Copy: Copies any selected text to the clipboard.

   iii. Paste: Pastes text from the clipboard to the I-bar position.

   iv. Find: Causes the "Find and Replace" dialogue box to open. The user can use this to search for a specific record in the database.

3) Tables: This menu allows the user to see "table-views" of the metadata:

   i. Reports: Runs the query REPORT_Q1 and displays the results as a table.

   ii. Report Authors: Runs the query REPORT_AUTHOR_Q1 and displays the results as a table.

   iii. Report Languages: Runs the query REPORT_LANGUAGE_Q1 and displays the results as a table.

The application uses one tool bar, called agsReport. It is this tool bar that appears and holds the "Print" button when a report is generated (see Section 3.3 "Application Operation").

3.3 APPLICATION OPERATION

3.3.1 Entering and Editing Metadata

When the application is launched, the main data entry and editing form, frmREPORT_Q1, appears. This form is used for most of the time when using the application, and is shown in Figure 5.

To enter a new record, click the >* button to navigate to a new (blank) record, and then enter metadata in the fields:

1) Inventory Number *: This is the unique inventory number of the document. This field can only take a number. This field is mandatory. Its data source is REPORT_Q1.inventory_number.

2) Year *: The year the document was compiled. This field is mandatory. Its data source is REPORT_Q1.year.

3) `Title in Dari`: The title of the document, written in Dari. This field is optional. Its data source is `REPORT_Q1.title_dari`.

4) `Title in English`: The title of the document, written in English. This field is optional. Its data source is `REPORT_Q1.title_english`.

5) `Title in other language`: This field is optional. If the document was written in some language other than English or Dari, the title is entered here, in the original language. Its data source is `REPORT_Q1.title_other`.

6) `Author Name, Dari; Author Name, English; Author Name, Russian`: The names of the authors are listed here. It is possible to enter the names of more than one author, by adding them onto the bottom of the list. No matter what language the document was written in, each author name should be recorded in both Dari and English. Where the document was written in Russian, "Author Name, Russian" is also used for the name in the Russian Cyrillic alphabet. The data sources for these three fields are `REPORT_AUTHOR_Q1.author_name_dari`, `author_name_english`, and `author_name_russian` respectively.

7) `Language`: The language(s) the document was written in is recorded here, by selecting a language from the select list. It is possible to enter more than one language, by adding new entries onto the bottom of the list. The data source for language is `REPORT_LANGUAGE_Q1.language`.

8) `Comments in Dari; Comments in English`: Additional comments about the document may be entered here. Comments should be recorded in both Dari and English. These are optional fields. Their data sources are `REPORTS_Q1.comments_dari` and `comments_english` respectively.

Clicking the √ button at top right of the form saves the current record to the back-end database. Navigating away from the record also causes it to be saved.

To navigate to a particular record, use the |< (first record), < (previous record), > (next record), and >| (last record), buttons to move between records. The form presents records in order by Inventory Number. You can also select "Find" on the "Edit" menu. This opens the "Find and Replace" dialogue box (Figure 6), which can be used to search for a particular record.

You can edit an existing record by making the necessary changes, and either clicking the √ button to save the record, or just navigating away from the record. Note that it is not possible to change the inventory number once it has been entered.

The "!" button causes the client application to re-query the back-end database. This has the effect of refreshing the data in the form. This is useful when two or more users are using the application simultaneously. If one user enters a new record, another user at another computer cannot "see" the new record until they re-query the database.

As well as seeing metadata one record-at-a-time on the form, it is also possible to see many records at once. Selecting "Reports" from the "Tables" menu causes the contents of the `REPORT` table to be displayed in table view, with the records sorted by Inventory Number (Figure 7). This is achieved by running the query `REPORT_Q1` and displaying the results, as described in "Application Structure" above. Selecting "Report Authors" or "Report Languages" from the Tables menu causes table views of author's names and report languages to appear in a similar way.

3.3.2 Generating and Printing a Report

Selecting the "Make Report" option on the "File" menu causes the "Select Reports" dialogue box to open (Figure 8). Select the Inventory Number of the document you wish the report to begin at from the first select list, and the Inventory Number you wish the report to stop at from the second select list, then click "OK". A report similar to that shown in Figure 9 appears. Note the print button at top left. Clicking on this button causes the report to be printed out at the default printer.

3.3.3 Getting Help

Selecting "About" from the "Help" menu causes the information box shown in Figure 10 to appear. This box shows the name and contact email address of the developer. There is also a hyperlink, "AGS Reports Data Input Help.doc". Clicking on this causes a user guide to be displayed. For this to happen it is necessary that the guide, `AGS Reports Data Input.doc`, is located in the same directory where the client application is installed on the client PC. This user guide is included as Appendix 1 in this report.

3.4 CATERING FOR DIFFERENT INPUT LANGUAGES

It is necessary for the application to accept and store metadata in English, Dari and Russian. Russian uses the Cyrillic alphabet. Dari uses the Farsi (Persian) alphabet and is read from right-to-left. Microsoft Access is able to store Unicode characters, so storing the metadata proved to be no problem.

This left the problem of keying the metadata into the application. In order to type using the Cyrillic and Farsi alphabets in Microsoft Windows XP, it is necessary to set up Russian and Farsi as "Input Languages". This is done through the "Regional and Language Options" setting on the Windows XP control panel. In addition, to type in Farsi you must install right-to-left language support, also done through "Regional and Language Options". Once these languages are installed, it is possible to switch between input languages by selecting the correct language from the language select list on the Windows Task Bar (Figure 11).

The project had access to a limited number of Russian language computer keyboards, which could be used to type in Russian. We also found the Microsoft "On-Screen Keyboard" to be a very useful tool. This can be used to "type" by clicking the keys on screen with the mouse pointer. The keys shown by the on-screen keyboard are appropriate to the currently-selected input language (Figure 12). This tool enables the user to type using a language for which they do not have a keyboard. The on-screen keyboard is found in Windows XP under the Start Menu at Start -> All Programs -> Accessories -> Accessibility -> On-Screen Keyboard.

4 Workflow for Metadata Capture

Capture of metadata using this application began in late February of 2005. Three counterparts were provided by AGS to be trained in this work. One of these had some computer experience, having worked with PCs in a Kabul construction company. The other two had no previous computing experience. It was necessary therefore to begin by providing a basic introduction to computing, and then training in the use of the application.

The AGS documents themselves are stored in two offices on the fourth floor of the AGS building. There is no network cabling or computers in these offices. The metadata capture was carried out in an office on the third floor, using three networked PCs.

The AGS librarian in charge of the document collections signed out documents to the counterparts in lots of around 20 at a time, keeping a record in a loans book. The documents were then processed in the third floor office. After keying of the metadata, the documents were returned to the fourth floor and signed back in.

Work proceeded very slowly at first because of the counterparts' unfamiliarity with the nature of the work and the technology being used. However they speeded up as they gained confidence.

By the time of writing, basic metadata on all approx. 2500 documents is available in English and Dari and in the original language (usually Russian) through the efforts of our Afghan counterparts and our Slovak sub-contractors. This includes about 350 documents whose sole language is Dari; our Afghan counterparts, and this application, were invaluable for processing these, as neither we nor our sub-contractors were able to translate, nor even type, Dari.

5 Concluding Remarks

In the course of this work, a methodology was developed for capturing metadata in multiple languages, using a simple Microsoft Access application. This methodology is not just applicable to the present work, but can be adapted for use in similar situations in other settings and countries.

Local counterparts were trained in the use of the application for metadata capture. The robustness and simplicity of operation of this application is demonstrated by the fact that the Afghan counterparts were able to continue to use it while the author was not present in country.

The metadata captured using this application subsequently formed the heart of the web database of AGS documents now searchable online at http://www.bgs.ac.uk/AfghanMinerals/ (October 2008).

Appendix 1 The User Guide Provided to Afghanistan Geological Survey Staff

INSTRUCTIONS FOR INPUT OF DATA ON AFGHANISTAN GEOLOGICAL SURVEY REPORTS

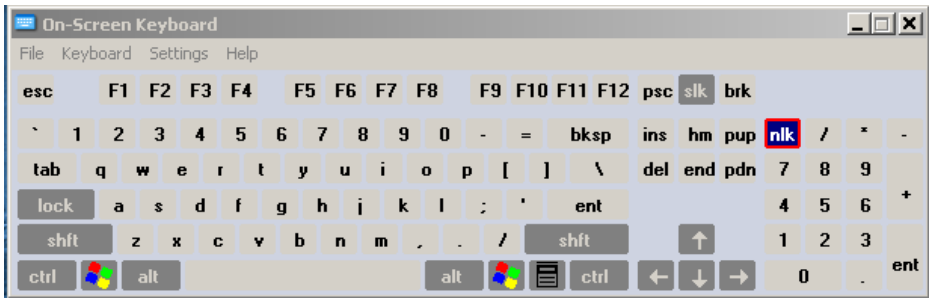
Tim McCormick
British Geological Survey
22 February 2005

1. Start the Reports Data Input application by clicking twice on the icon:

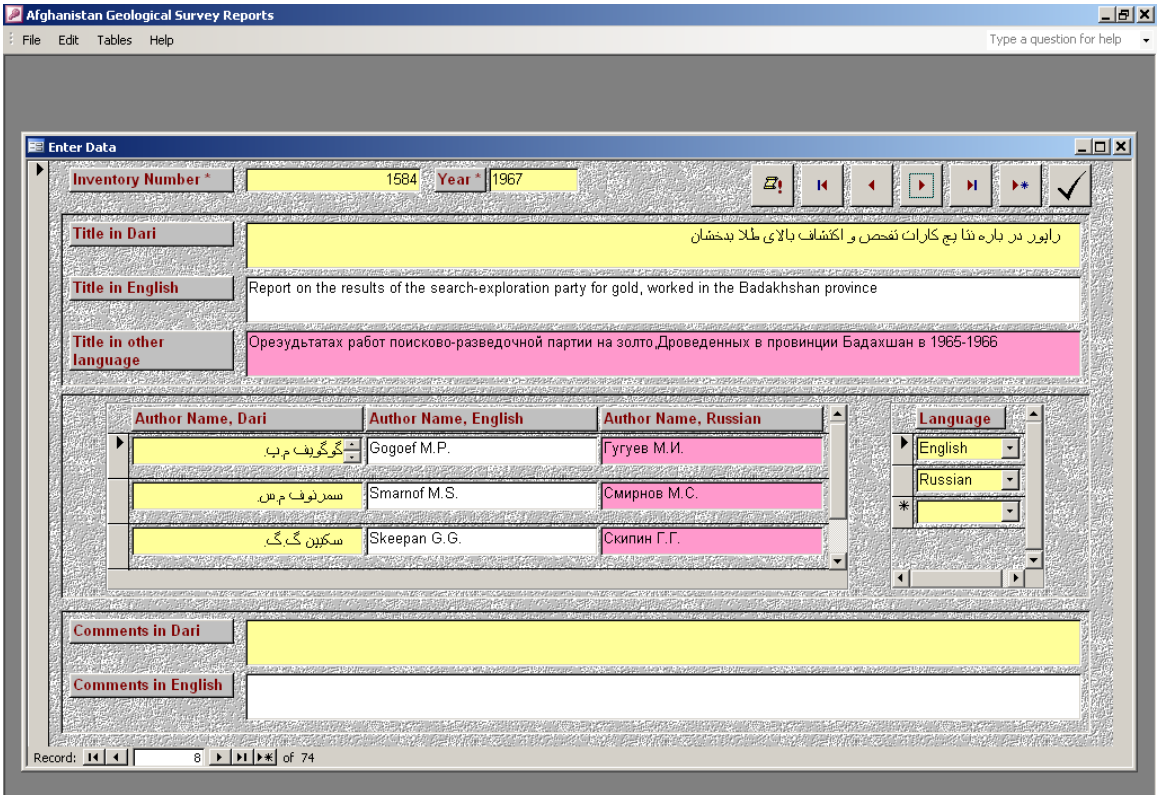
2. If you want to use the On-Screen Keyboard, start it by clicking twice on its icon:

(If there is no On-Screen Keyboard icon, you can open the On-Screen Keyboard by clicking on Start → All Programs → Accessories → Accessibility → On-Screen Keyboard.)

The On-Screen Keyboard looks like this:



3. The Reports Data Input screen looks like this:



a) Menus

There are 4 menus at the top of the screen:

File:

Make Report: Click this to make a printed list of reports.

Exit: Closes the application.

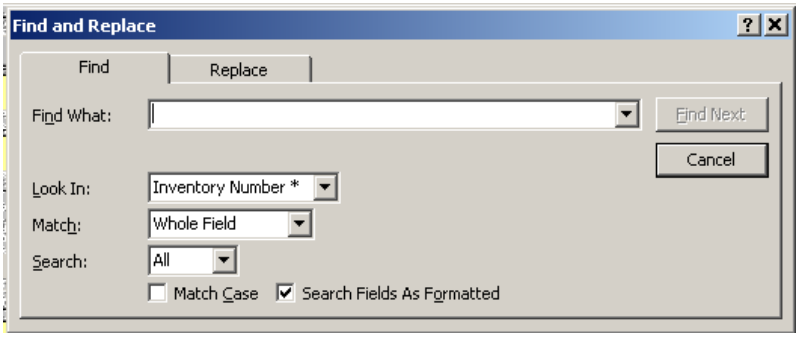
Edit:

Cut: Cuts the selected text.

Copy: Copies the selected text.

Paste: Pastes the cut or copied text at the position of the I-bar.

Find: Opens the “Find and Replace” box. This allows you to search for a word or number in the database.



Tables:

Reports:	Opens the list of reports in table view.
Report Authors:	Opens the list of authors in table view.
Report Languages:	Opens the list of languages in table view.

Help:

About:	Opens a form that gives information about this application.

b) Buttons

There are 7 buttons at the top right of the “Enter Data” form:

 : re-queries the database (that is, it recalls the data from the database)

 : goes to the first record

 : goes to the record before this one

 : goes to the record after this one (or a new blank record if you are already at the last one)

 : goes to the last record

 : makes a new blank record

 : saves the current record

C) Fields

The fields to type data into are:

Inventory Number *
This is the number written in pencil on the bottom right of the label on the front cover of the report. This field MUST be entered.

Year *
The year the report was compiled. This field MUST be entered.

Title in Dari
This is the title of the report, in Dari.

Title in English
This is the title of the report, in English.

Title in other language
If there is also a title on the report in some other language, for example Russian or German, type it here.

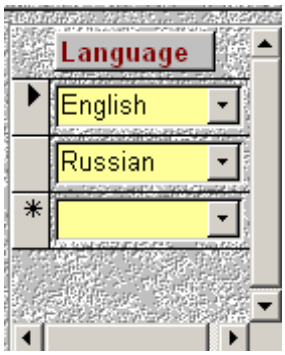
Author Name, Dari
List the names of the authors, in Dari alphabet.

Author Name, English
List the names of the authors, in English alphabet.

Author Name, Russian
If the report is written in Russian, list the names of the authors using Russian alphabet here.

Language
Select the language the report is written in from the list:

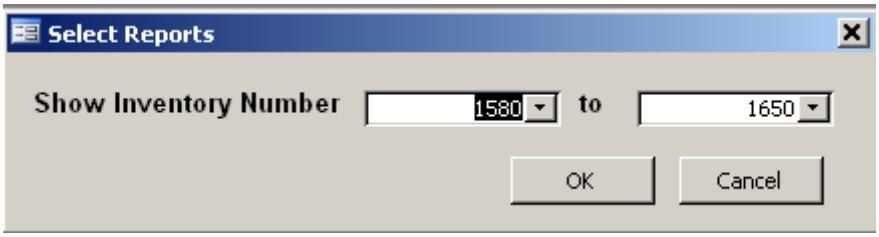
If the report is written in more than 1 language, list the languages like this:



Comments in Dari
If there is any extra information that is helpful about the report, type it here in Dari. For example, if there is more than 1 copy of the report, say that here.

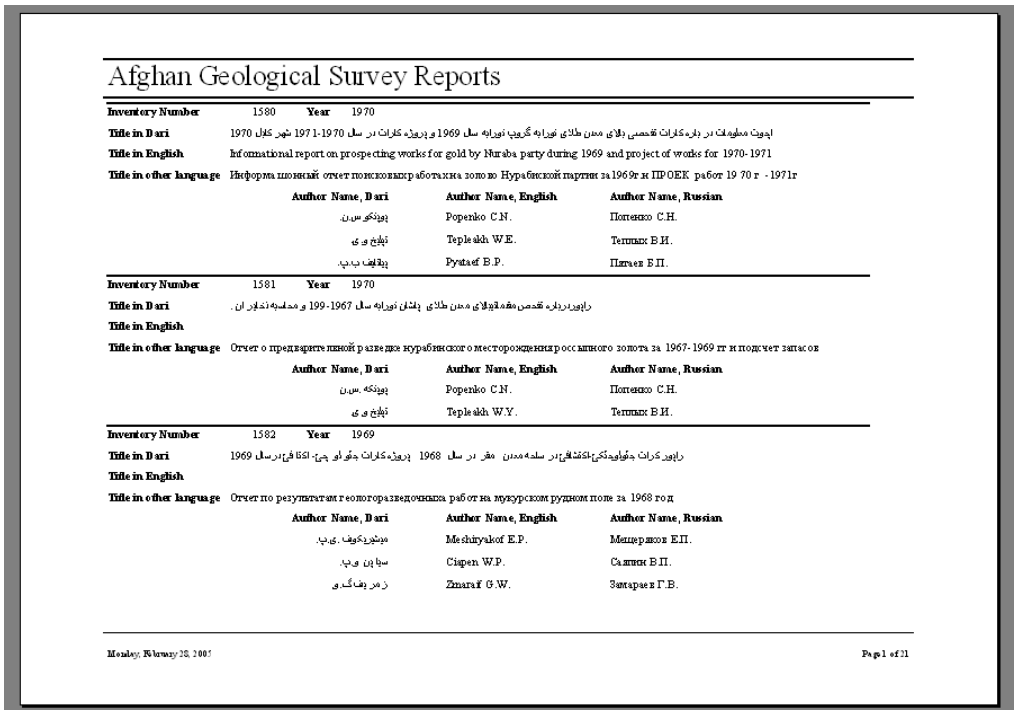
Comments in English
These are the same as the comments in Dari, but in English.

4. To make a printed list of reports, click “Make report” on the “File” menu. This box appears:



Select the report number to start at and stop at. In the example here, the list will start at report number 1580 and stop at report number 1650. Then click “OK”.

When the report appears, it looks like this:



Afghan Geological Survey Reports

Inventory Number 1580 **Year** 1970

Title in Dari 1970 شهر کابل 1971-1970 و پروژه کارات در سال 1969 ایجاد معلومات در باره کارات تفحصی دلای معدن طلای نیرابه گروپ نیرابه

Title in English Informational report on prospecting works for gold by Nuraba party during 1969 and project of works for 1970-1971

Title in other language Информационный отчет поисковых работ Нурабинской партии за 1969 г и ПРОЕК работ 19 70 г - 1971 г

Author Name, Dari	Author Name, English	Author Name, Russian
پوپنکو س.ن.	Popenko C.N.	Попенко С.Н.
تیلیخ و ی	Teplekh W.E.	Теплых В.И.
پیاتایف ب.پ.	Pyataef B.P.	Пятаев В.П.

Inventory Number 1581 **Year** 1970

Title in Dari راپور در باره تفحص مقدماتی دلای معدن طلای پشان نیرابه سال 1967-199 و محاسبه ذخایر ان .

Title in English

Title in other language Отчет о предварительной разведке нурабинского месторождения россыпного золота за 1967-1969 гг и подсчет запасов

Author Name, Dari	Author Name, English	Author Name, Russian
پوپنکه .س.ن	Popenko C.N.	Попенко С.Н.
تیلیخ و ی	Teplekh W.Y.	Теплых В.И.

Inventory Number 1582 **Year** 1969

Title in Dari راپور کارات جیولوجی اکتشافی در ساحه معدن مقر در سال 1968 پروژه کارات جیو او جی- اکتشافی در سال 1969

Title in English

Title in other language Отчет по результатам геологоразведочных работ на мукурском рудном поле за 1968 год

Author Name, Dari	Author Name, English	Author Name, Russian
میشیریکوف ی.ی.پ.	Meshiryakof E.P.	Мещеряков Е.П.
سیاپین و.پ.	Ciapen W.P.	Сапин В.П.
زمرایف گ.و	Zmaraif G.W.	Змараев Г.В.

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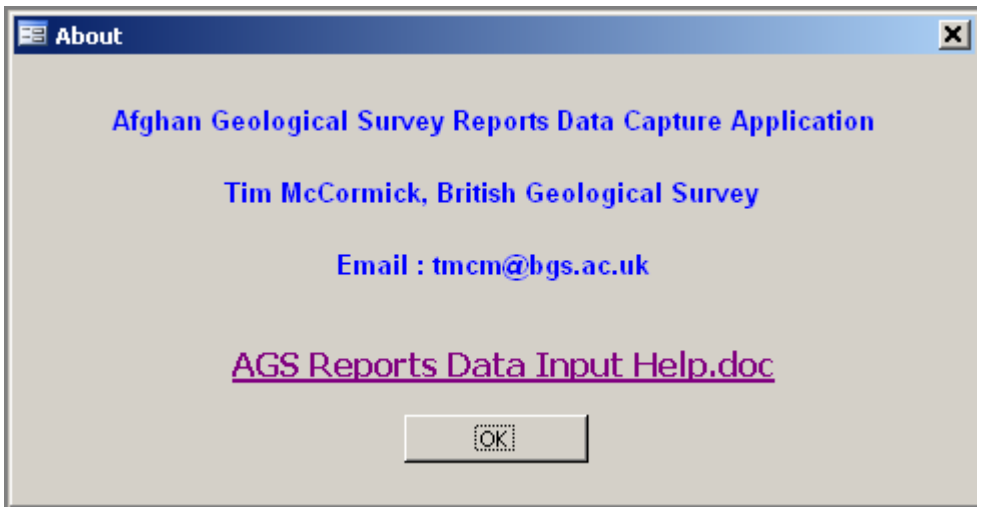
While the report is open, there is also a print button at the top left of the screen, which looks like this:

Click on this button to print out the report.

5. In case of problems, click “About” on the “Help” menu. This box appears:



This gives Tim McCormick’s email address at BGS. It also has the words: AGS Reports Data Input Help.doc. If you click on this, this document opens.

Glossary

Data Model	An abstract model defining the collection of tables, fields and relationships that makes up a relational database.
Field / column	A single location in a record holding an item of data used to describe one attribute of the subject of the database. For example, the `REPORT` data table has fields for `inventory_number, year, title_dari, title_english, comments_dari, comments_english`, *etc.* When a table is displayed, the fields form columns in the table.
Foreign key	When a relationship is made between two tables, it is normal to relate the primary key field in one table to a field in the related table. The field in the related table is known as the "foreign key".
Form	A graphical user interface component that provides a "user-friendly" view of the data in a database, with the aim of making data entry faster, easier and more accurate. Often forms include "subforms", another form embedded in the main form for a specific purpose. A modal form is one that remains in the foreground until some user-input is made.
Graphical User Interface Component	An object on the screen that the user interacts with to perform some operation. They include forms, menus, buttons, select lists, and other components.
Menu	A graphical user interface component providing a list of options ("menu items") that allows the user to control the operation of the application. For example, this application has "File", "Edit", "Tables" and "Help" menus. The menus are arranged along the "menu bar" which appears at the top of the screen.
Primary key	The primary key is one or more fields whose values are unique for each record in a table. The primary key allows the database management software to uniquely identify each record in a table.
Query	A set of instructions that retrieves data matching specified criteria from a database.
Record / row	A collection of fields that represents the data for a single entry in a data table. When a table is displayed, the records form rows in the table.
Report	A graphical user interface component that is used to display data retrieved from a database formatted in a way suitable for printing out on paper.
Table	A data structure in a digital database that stores data in the form of fields and records.
Toolbar	A graphical user interface component that holds buttons which the user can click on to perform an operation. For example, when a report is generated by this application, a toolbar also appears holding a print button that is clicked to print the report out.

Tables

Table 1 Design of the REPORT table.

Column Name	Column Design	Description
INVENTORY_NUMBER	Primary Key Long Integer Required	Inventory number. This must be unique for every document.
YEAR	Text (10) Required	Year the document was compiled. Uses the Western calendar.
TITLE_DARI	Memo Optional	Title of the report, in Dari.
TITLE_ENGLISH	Memo Optional	Title of the report, in English.
TITLE_OTHER	Memo Optional	Title of the report in its original language, if that was not English or Dari.
COMMENTS_DARI	Memo Optional	Comments about the entry, in Dari.
COMMENTS_ENGLISH	Memo Optional	Comments about the entry, in English.
DATE_ENTERED	Date/Time Required Default = Now()	Date/time of data entry. Populated automatically on data entry, using the Visual Basic Now() function.

Table 2 Design of the REPORT_AUTHOR table.

Column Name	Column Design	Description
INVENTORY_NUMBER	Long Integer Required Indexed (duplicates OK)	Inventory number. Foreign key to REPORT.inventory_number.
AUTHOR_NAME_DARI	Text (50) Optional	Author's name, using Dari alphabet.
AUTHOR_NAME_ENGLISH	Text (50) Optional	Author's name, using English alphabet.
AUTHOR_NAME_RUSSIAN	Text (50) Optional	Author's name, using Russian alphabet.
DATE_ENTERED	Date/Time Required Default = Now()	Date/time of data entry. Populated automatically on data entry, using the Visual Basic Now() function.

Table 3 Design of the REPORT_LANGUAGE table.

Column Name	Column Design	Description
INVENTORY_NUMBER	Primary Key 1 Long Integer Required	Inventory number. Foreign key to REPORT.inventory_number.
LANGUAGE	Primary Key 2 Text (10) Required	Language.
DATE_ENTERED	Date/Time Required	Date/time of data entry. Populated automatically on data entry, using the Visual Basic Now() function.

Figures

Figure 1 A typical example of the documents held by the Afghanistan Geological Survey. This one is a geological report written in Dari and has a number of graphical annexes.

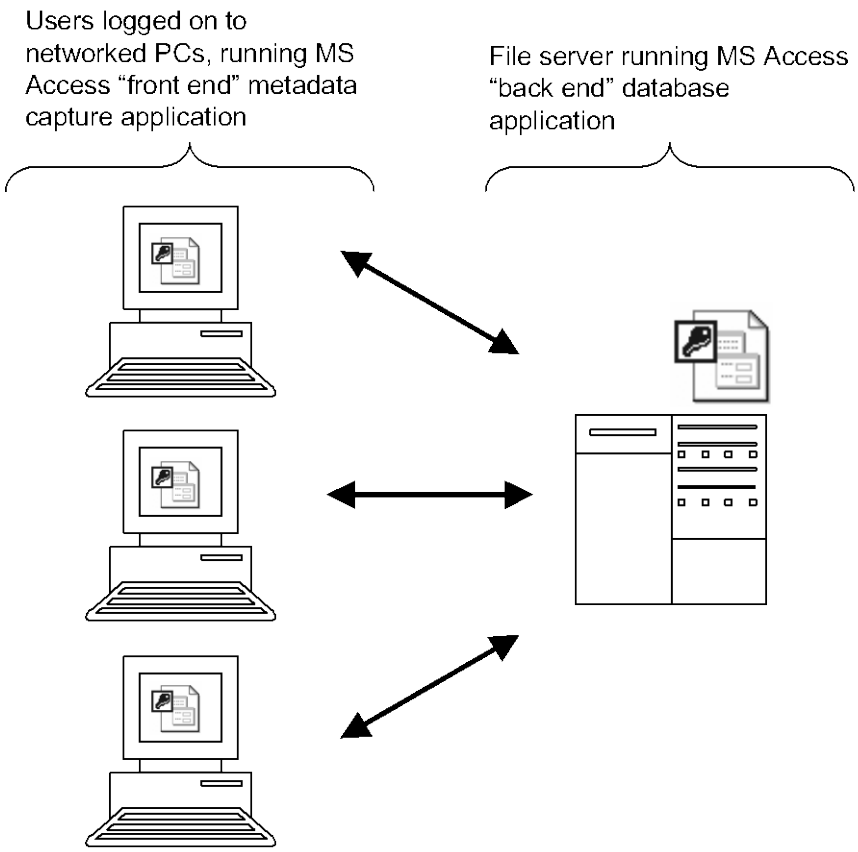


Figure 2 The IT architecture within which the MS Access application operates. The data are stored by the database application, which runs on a networked file server. This database is communicated with using the "front-end" or "client" application, copies of which are installed on several PCs within the AGS building.

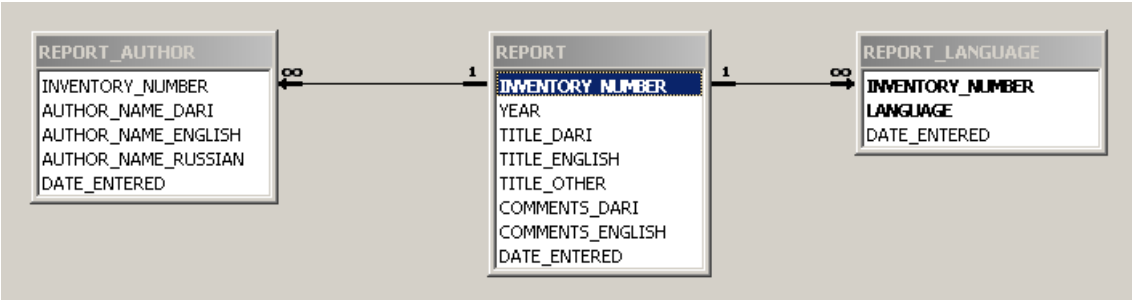


Figure 3 Data model for the application. The database has three tables: REPORT, REPORT_AUTHOR, and REPORT_LANGUAGE. There is a 1-to-many relationship between REPORT and REPORT_AUTHOR (because each document can have more than one author, while each author must be the author of a document). There is a 1-to-many relationship between REPORT and REPORT_LANGUAGE (because each document can be written in more than one language, while each language must be the language of a document).

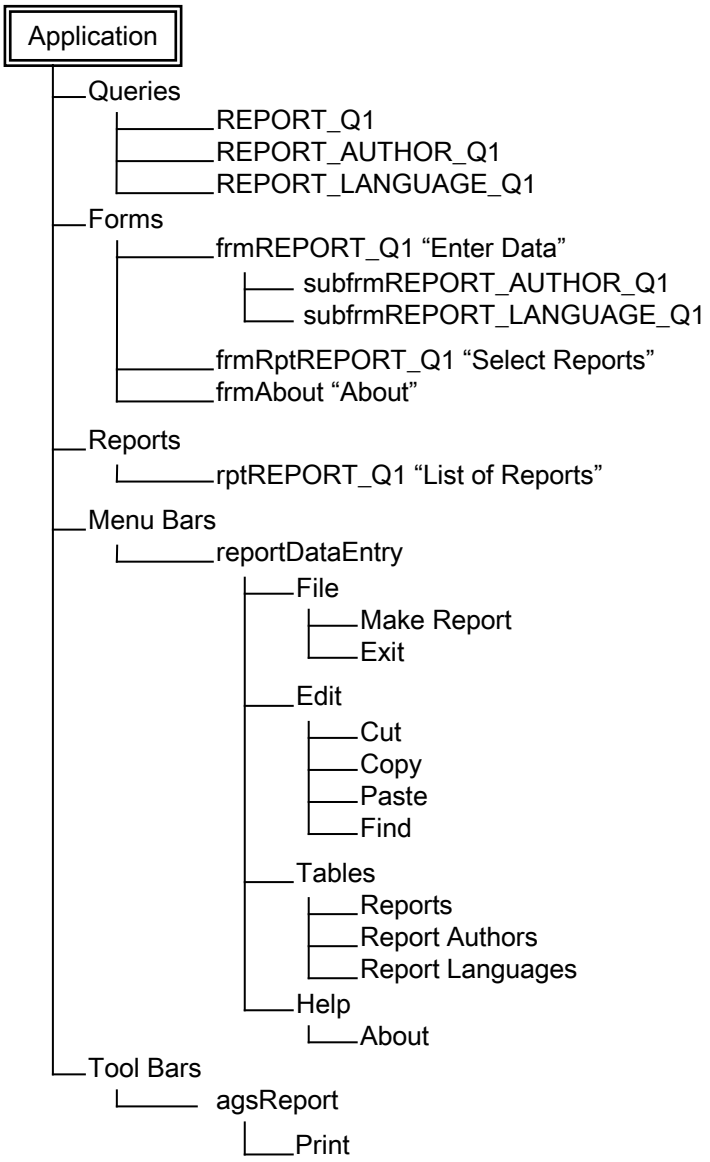


Figure 4 The components comprising the client application. Each of the components is described in detail in the text.

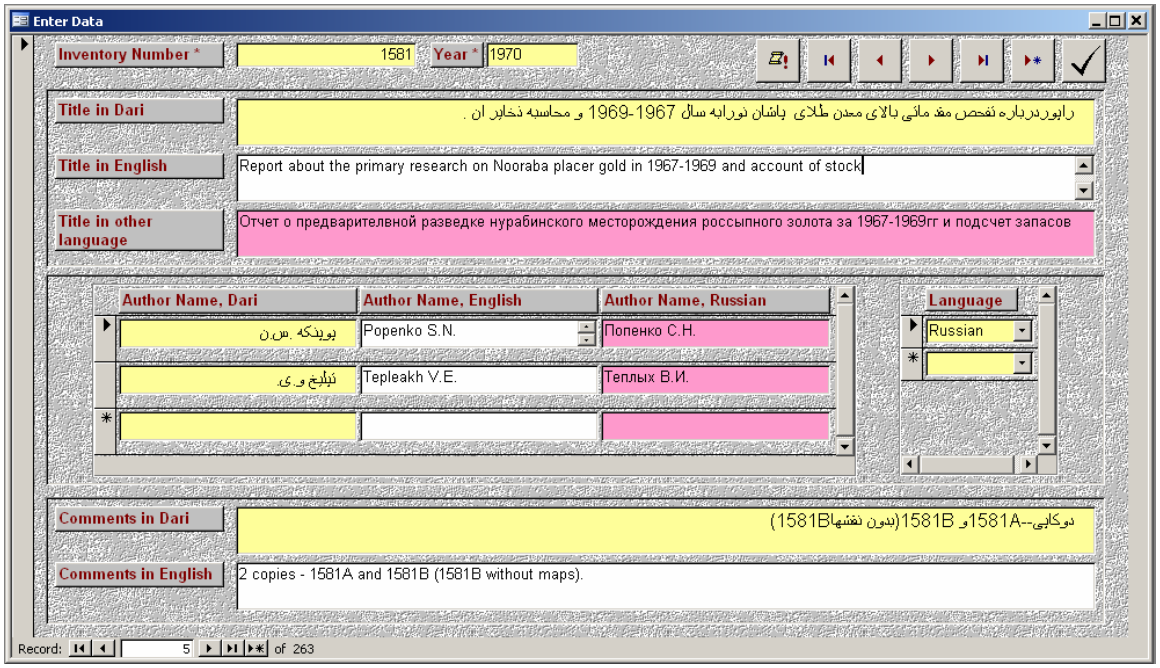


Figure 5 The main data entry and editing form, frmREPORT_Q1. This is displayed when the application launches.

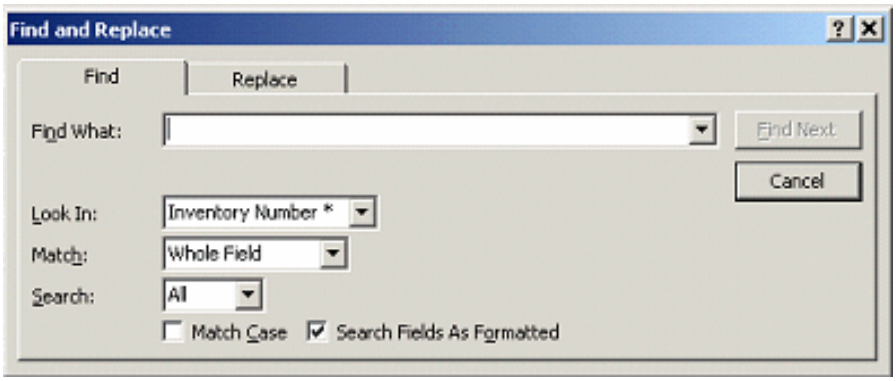


Figure 6 The "Find and Replace" dialogue box. Selecting “Find” on the “Edit” menu causes this to be displayed.

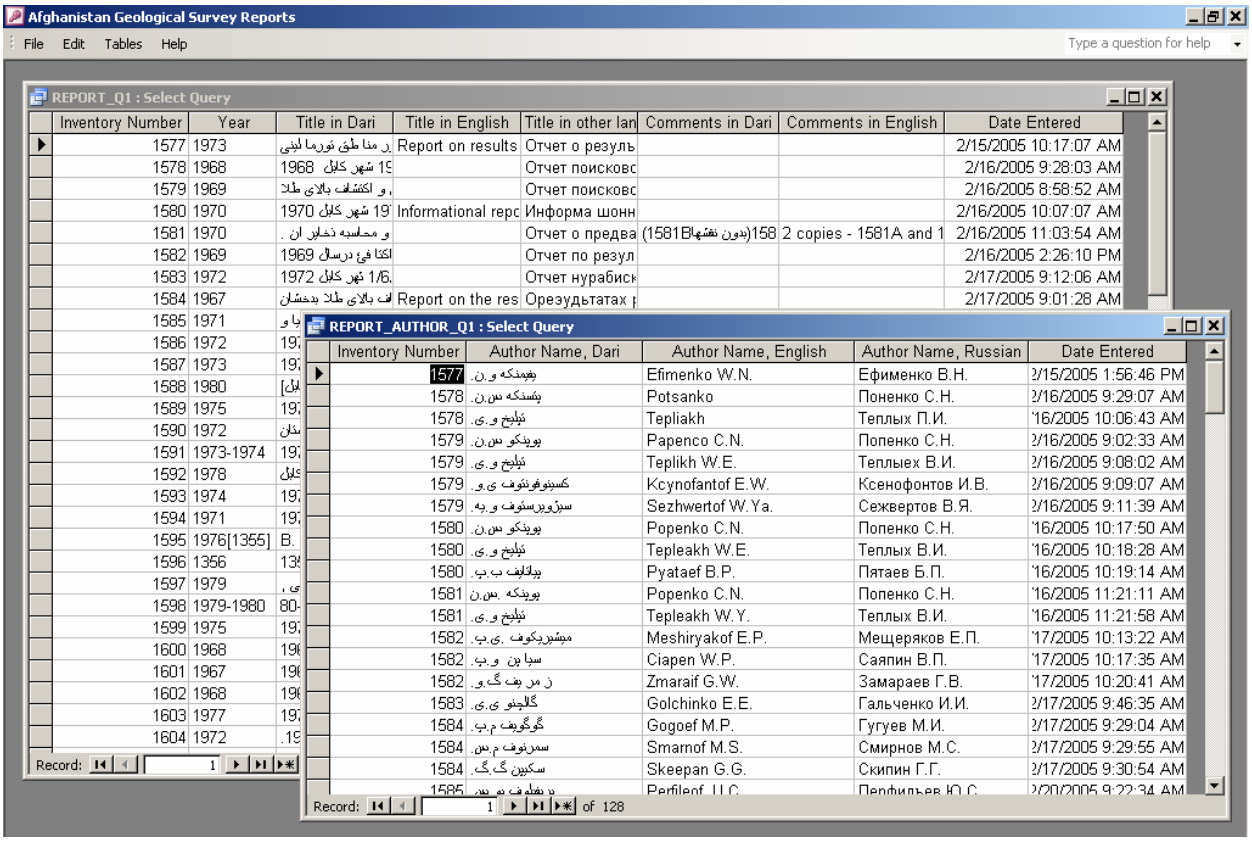


Figure 7 The result of selecting “Reports”, and “Report Authors” from the “Tables” menu. Table views of the documents and authors data are displayed.

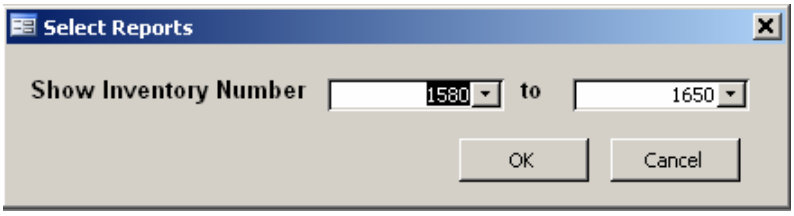


Figure 8 The "Select Reports" dialogue box, frmRptREPORT_Q1. Selecting "Make Report" from the "File" menu causes this to be displayed.

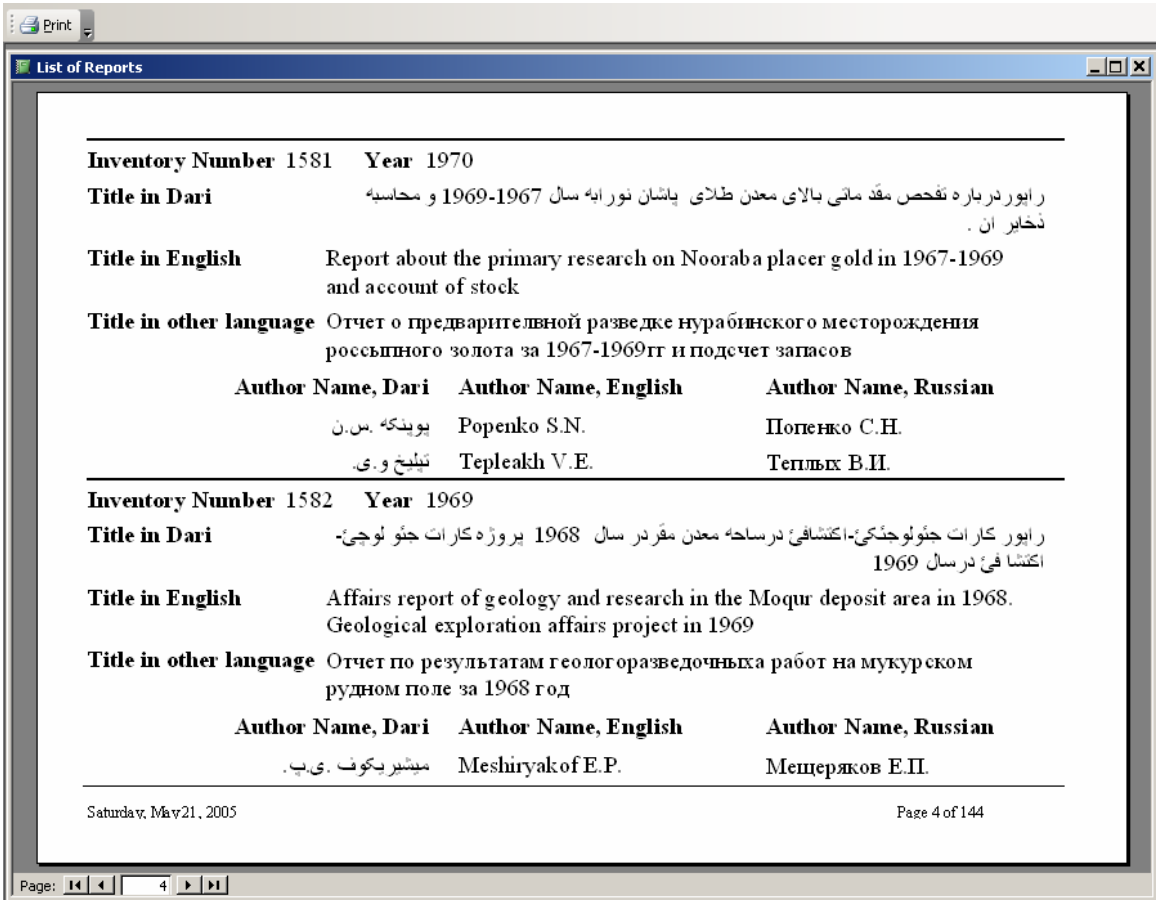


Figure 9 A report. Clicking "OK" on the "Select Reports" dialogue box causes this to be displayed. Note the toolbar with a "Print" button above the report. Clicking the "Print" button causes the report to be printed out at the default printer.

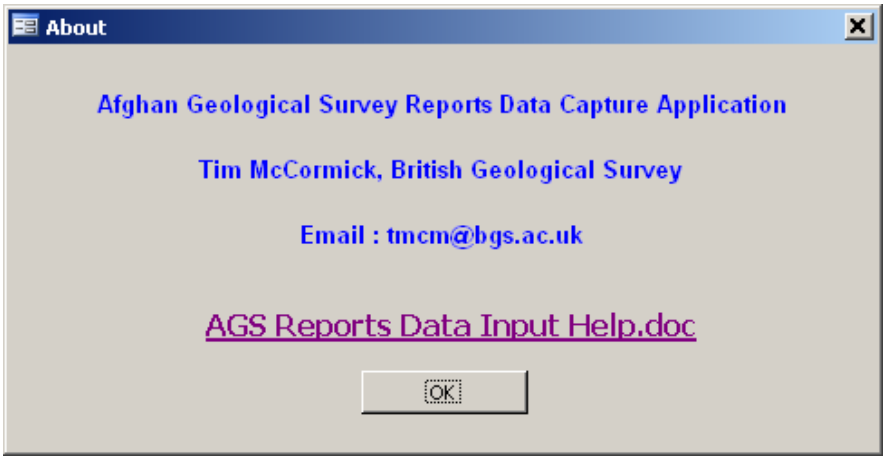


Figure 10 The "About" form, which shows the name and email address of the developer. It also has a hyperlink that opens the user guide presented in Appendix 1.

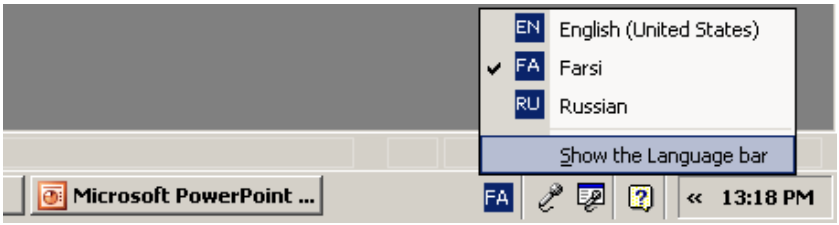


Figure 11 The language toolbar. To input data using one of the languages select it from the list.

Figure 12 The Microsoft Windows on-screen keyboard. Two instances of the keyboard are shown: the upper one has the input language set to Farsi, the lower one has the input language set to Russian.