Improving the efficiency of searching in patents

– the role of education and the human factor in an age of electronic information. –

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1 INTRODUCTION: "WE ARE ALL SEARCHERS NOW…"

We live in a world where more and more of the information which we need is being created and stored in electronic form. The software which provides access to this information is getting smarter, so that there is increasing emphasis on "natural language" input and "relevance ranked" output. In the developed world, and much of the developing world as well, nearly every home will have a laptop or tablet which has become our "window on the world". The combination of these three developments – the form of the information, the technical solutions to searching it, and the ease of access to it – might lead us to think that all our problems in locating and using information are solved. Many people, especially the younger generation, expect that retrieval of information is – indeed, must be – an "easy" process. We all know that every search on a generic internet search engine such as Yahoo! ® is likely to produce many thousands, if not millions, of hits. So how hard is it to be a good searcher? Maybe we are approaching a point in time where we will no longer need to train anyone to search – the best answers will simply "arrive", through advanced software and hardware processing of digital information.

2 WHAT MAKES PROFESSIONAL SEARCHING DIFFERENT?

My article seeks to investigate the question of education for professional searchers. Is it a necessary factor in achieving high quality search results? – or will the influence of the searcher diminish as search technology improves? In order to answer this question, we need to recognise that conducting searches in scientific or technical information has much in common with the "everyday" searches which we do at home, but also some differences.

For example, a great deal of modern patent information is already digitised. Consequently, it could be argued that it is no longer necessary for the education of a patent searcher to include a knowledge of exhaustive lists of paper-based or microfilm-based sources. However, even the least-skilled "everyday" internet searcher will soon realise that the mere fact that information is "on the computer" (i.e. digital) does not guarantee that it is of good quality or reliability. Many "everyday" searchers soon learn to focus their efforts on a relatively few, known and

trustworthy sources. Without realising it, they have grown in their information literacy skills – the ability to discriminate between sources and to make informed decisions about where to search. For the searcher who specialises in highly technical subject-matter, this type of information literacy is needed to a much greater degree. So this is one area where we can recognise that searcher education might need to be more formalised and comprehensive.

A second aspect which distinguishes the "everyday" searcher from the professional is in understanding the capabilities of the technology which they have available for search. Performing a search on the fastest, most up-to-date hardware does not necessarily make the process any easier or the results any better. Neither does using the most complex, semantic-based, relevance-ranking software guarantee better results than 60-year old Boolean retrieval. Evidence shows that few non-specialist searchers will attempt to use more than two or three obvious keywords, and never explore the more advanced aspects of the tool available. But in professional searching, a good understanding of the hardware and software (collectively, the "search engine") may be crucial to being able to retrieve results which are relevant and usable. Of course, in an ideal world, both the information source and the search engine are high quality, and this increases our confidence in the results. However, too often in real life we may be faced with a compromise. The search engine may be very advanced but the information quality is poor, or (conversely) a poor search interface or some other defect in the search engine hinders our ability to perform an optimum search, even in a high quality database. It is clear that a professional searcher must have the necessary skills to use each tool to its best effect, not just rely upon a single "data + search engine" combination.

So both information sources and search engines are important components of a good search. But the best searches will be those where the third aspect, the person performing the search, is equally prominent. Just as with a three-legged stool, where the loss of any one leg destroys the ability of the stool to do its job (act as a seat), so it is with information searching. We may work hard to improve data quality, or to improve the efficiency of databases and our ability to navigate large answer sets, but if the human being sitting at the keyboard is not skilled, we will still get a poor result.

If this hypothesis is correct, then it is still important, in our quest for search efficiency, to pay attention to the education and training of the people who perform our searches.

3 HOW DO WE LEARN ON THE JOB?

The commercial information industry has a long history of providing training to its customers on how to search their databases effectively. For many people starting in patent information work, their first exposure to the whole concept of patents as a source of technical information arises from their attendance at a course run by a database vendor. However, as more free-of-charge tools have been launched (e.g. the EPO' s Espacenet or the JPO' s JPlatPat), this tradition of hands-on instruction has been eroded. New users are told that the interface is "intuitive" , and

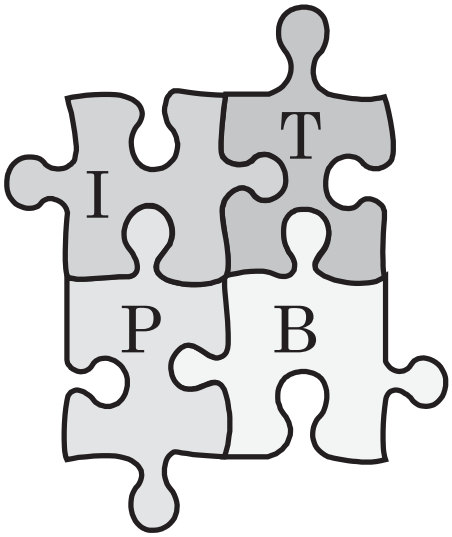
help files often consist of only brief examples of certain forms of search. More systematic training may be available, but it can consist principally of online webinars or similar medium. Although these forms of training are helpful, they also tend to concentrate on issues such as search syntax or display features, and do not normally address the fundamentals of how patent information is created, and what you need to know in order to search it effectively. At this point, the beginner is operating in a vacuum – they "do not know what they do not know" . Sometimes, it is possible to spend many months or even years in a patent search job, and never encounter certain aspects. You may think that you know patent information searching, but there is only a limited area of expertise where you truly feel comfortable. For example, some years ago I encountered a searcher who considered themselves to be highly experienced. As we spoke, it became clear to me that there were large gaps in their knowledge. Although this searcher knew how to use all the commands on the search system, they did not understand the underlying data at all. All their work had been done in US patents, and they had only a very vague idea of prior art from other countries, and no concept at all of a patent family! The longer a person stays in that situation, the more dangerous it is, both for them and for their customers. It is clear that learning new ideas and practices gets more difficult as we get older, and a patent searcher who has spent many years working in a closed, insular environment will find it very hard to compete in a global context.

For this reason, I believe that all patent searchers would benefit from going through a systematic training programme early in their career. This may include a recognised academic course, such as a Masters-level degree in Information Studies or a related subject such as Business Administration. But this is exceptional – most new entrants to patent information work gain their expertise on the job. This may be from internal business mentors, if they are lucky enough to be in a corporate information team with other experienced members, or by attending external events such as conferences and training courses. Whichever route is used, the most important aspect is that the student has a clear idea about the whole range of skills needed, and does not concentrate on their "comfort zone" , or even on the areas which their management tells them are "core subjects" . Unfortunately, the management of a corporate information team will not always know where the skills gaps exist within their team, so they should not be the sole source of advice on how to fill those gaps.

4 A MORE SYSTEMATIC APPROACH

Over many years of working with patent information, I am convinced that there are still new nuances to learn every day. No-one, however experienced in years, has the whole truth. But I will be bold enough to suggest a broad classification for the skill set of the patent searcher, in the hope that every patent searcher reading this article will be able to identify some areas where they might benefit from further professional development. This may be in the form of "refresher" training, the learning of entirely new skills, or simply realising that their job skills could be employed in a different way.

In the diagram below, I have illustrated 4 major aspects of the skill set for a patent information specialist. These areas are:



T – Technical skills; patent documents deal with inventions from all areas of science and technology, and the best searchers will be those who are comfortable with the technical language used in the documents.

I – Information Science; despite the advances in everyday information access, it is not true that "everyone is a searcher now" , especially in the scientific field. A thorough understanding of information storage and retrieval is the backbone of good searching skills.

P – Patent law and procedure; patent searching is an interactive process, and it is important to be able to interpret the meaning of each document which is revealed during a search. Otherwise, the search will deliver only "data" and not "actionable intelligence" .

B – Business skills; this is a very broad area in its own right, and includes understanding how industry works, as well as other business-related skills such as project management.

Let us consider in turn what each skill area can deliver for the complete patent searcher.

4.1 Technical skills: Whenever one person, who needs certain information (e.g. has this invention been made and published before?) hands over the process of searching for that information to another person, it is vital that there is mutual respect and trust between the two people. The information requestor (client) may be a subject expert but find it difficult to explain to anyone else what the invention is about. They may know that their invention differs by only a very small amount from similar, earlier inventions, and hence which distinguishing factors need to be highlighted. They will seek to brief the searcher using highly technical, detailed language, and in turn the searcher must be sufficiently skilled in the technical field to understand both what the client is describing and what they are likely to find in the prior art. The searcher must be able to demonstrate to their client that they have the appropriate professional understanding to take on the job. For example, if I am approached by a telecommunications engineer, I would be very reluctant to take on a search request, because I am a chemist and do not really understand electronics. Searchers who are based in private practice have a very demanding job, because one day they may have a search on a medical device, the next day it may be a new type of training shoe, the next day it may be part of a mobile phone handset. Their technical skills need to be sufficiently up-to-date to search through and interpret (at least in the broad aspects) the prior art which they locate. If you are a searcher in a corporate environment, and your company has a well-defined area of business, your professional credibility as a searcher will in part depend upon how well you

understand the technology which underlies your company' s products. For this reason, it is very difficult for someone with an arts or humanities education to become a truly skilled patent searcher, because they do not have the basic science skills required. Unfortunately, there is a tendency in some patent attorney practices to delegate search work to paralegals with no technical background, and this is not good for either the quality of search or the self-confidence and job satisfaction of the person doing the search.

To summarise, good technical skills are necessary for the searcher in order to:

1. Maintain credibility and good relationships with their clients,
2. Understand highly technical queries and conduct searches in scientific databases, and
3. Assess answers and report them in a relevant and competent manner.

4.2 Information science: There are many definitions of 'information science' but one which is useful in this context is the statement that it is an amalgam of different disciplines which are *"brought to bear in solving the problems with information – its generation, organization, representation, processing, distribution, communication and use."* [1]. For the patent information specialist, that means gaining experience and insight into the variety of different search sources, their strengths and weaknesses, their accessibility, completeness and quality, together with the various methods of searching, retrieving and analysing the content of a search. At first sight, this might appear to be the smallest out of the four aspects, in that there is only a limited number of data suppliers around the world (compared, for example, with trying to search all the different newspapers in Japan, there is only one Patent Office), and only a limited number of key databases suitable for everyday use. But the situation rapidly becomes more complex when we realise that some commercial databases add new database elements (or fields) which make these products distinct and searchable in different ways to the original data as published by the office. In addition, there is a large difference between "searching patents" and "searching for patentability" ; someone who is a complete expert in patent databases, but who knows nothing of non-patent literature sources, cannot reliably deliver high quality searches for patentability in every area of technology. We live in an age where our national patent laws and international patentability standards demand a "universal novelty" , but where simultaneously, mankind is generating new information at a higher speed than ever before. The size of the state-of-the-art, whether it is measured in Terabytes, number of pages or some other metric, is increasing daily, and hence the work of the patentability search gets more difficult by the day.

In addition to knowing sources of information, and how to search them, the skilled searcher should also be familiar with other aspects of information science, such as developments in searching tools and interfaces, search engine technology, and the application of standard or customised software tools to the analysis and navigation of large volumes of highly technical information – some of which may not even be in character-coded form. We are a long way from having effective tools for direct searching of images, diagrams, pictures, video – all of which

are part of the state-of-the-art.

4.3 Patent law and procedure: Some information specialists worry that they are expected to know patent law in their jobs. They think, "Will this mean that I am becoming a patent attorney?" , or that they might be expected to deliver legal opinion. But that is not the intention in a good education programme for an information specialist. The laws and procedures surrounding patent *information* and patent *documentation* in general are quite distinct from the procedural aspects which a professional representative (attorney or agent) is expected to know. The business of patent searching involves skills which complement – not compete with – those of the attorney. In particular, searchers need to know enough of law and procedure to be able to interpret the relevance of the findings of the search. This means that as frequently as patent law changes, so does the set of rules which every searcher is expected to know in order to do that analysis. Even an apparently simple task such as computing a predicted expiry date (for example, in the context of a freedom-to-operate search) is made more complicated every time a national law or procedure changes. So in considering the need to understand patent law, there are two distinct differences between the role of the patent attorney and the role of the searcher. Firstly, the searcher will be more concerned about the laws, procedures and standards surrounding publication, which are often neglected by attorneys, and secondly, the searcher must be aware of many different versions of law. An attorney generally has little use for old law – their duty is to be familiar with the newest procedures. But the searcher may locate documents which were processed and published under laws which were in force years or decades before – they must, in effect, be a 'living archive' of the historical procedures as well as the current ones.

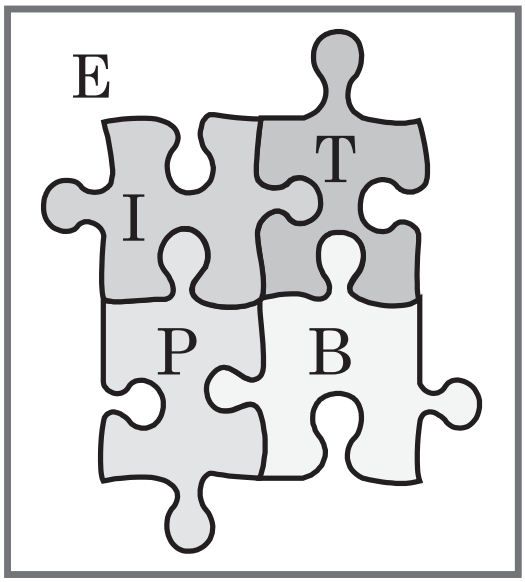
4.4 Business skills: This last aspect covers many different skills, but they contribute to the general competence of a skilled patent searcher. In some ways, the best searcher needs to be a specialist (having specific, highly-focussed skills) and a generalist (interested in many different fringe aspects surrounding the job) simultaneously. They should have both a depth and a breadth of knowledge. In the patent searching business, the old saying is true: "You never know when something might be useful" . In performing my job over a number of years within a chemical company, I found an outlet for seemingly "useless" facts relating to politics, geography, history, business, regional and international law, languages and much more. Every searcher needs to know the context (wider picture) of a specific search if they are to do the best job. This means that, for a searcher within a company, it will help them if they have a good working knowledge of the whole range of products which their employer makes and where they are marketed. They should know the broad research strategy within the business, as well as the specific project which has led to the latest, potentially-patentable invention. This part of a searcher' s education is partly self-driven (making a wise choice about what to read and retain) and partly from external sources, such as professional networking with others in the same or similar fields of work.

On top of this package of "general knowledge" , it is also a good practice to gain other skills which may come in useful within

the information team (or especially for the solo professional). This can include learning software packages to higher-than-average levels of detail, basic software coding or programming, project management skills, report writing and presentation skills, communication and inter-personal relations. Ultimately, our entire professional base depends upon communication – receiving and understanding requests from others, interacting with them during the search, and dispatching our results to them in a form which they can use in their jobs. That kind of expertise cannot be learnt from a book – but it can be learnt *over time*; and that brings me to the final two aspects of the professional searcher' s skill set.

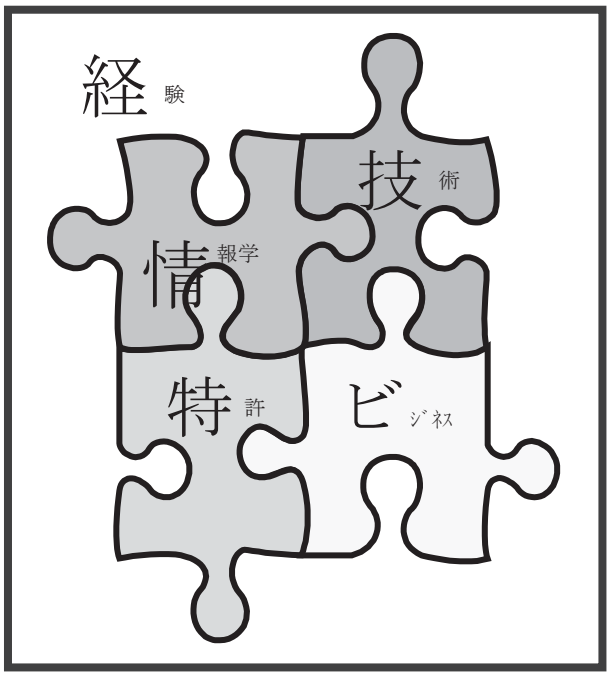
5 GROWING IN COMPLETENESS: EXPERIENCE AND TIME.

Up to this point, we have assumed that if anyone succeeds in "filling in all the blanks" in the diagram (above), they will be a skilled searcher. But in fact, even this illustration suffers from being incomplete. A more accurate picture might be the second diagram below:



The letter "E" surrounding our 4 areas of skills represents a vital factor which envelops all of the other areas of learning – Experience. Up to a point, any well-educated person will be able to gather skills from the four key areas, and accumulate enough "facts" to be able to represent themselves as an good searcher. But the factor which separates a good searcher from an experienced one is their ability to learn when their existing skills break down. There is an interesting quotation, variously attributed to Prof. Randy Pausch [2] or to Dan Stanford [3] which states that "Experience is what you get when you didn't get what you wanted…" . An experienced searcher is a better searcher, because they have encountered at first hand some of the pitfalls and problems when their 'perfect' strategy goes wrong.

To grow in experience, we all need other people around us. Patent searching is a specialist activity, and it is quite possible, even within a very large corporation, for the single person who does patent searches to feel



(左の英語図を日本語で参考表示)

very isolated. That is not a good environment in which to gain experience. It is vital for every patent searcher to have some other people around them, to help them to grow by experience. These may be colleagues in other companies, that you meet professionally at conferences or seminars. Alternatively, if you are lucky enough to be in a team of searchers in your work-place, you may have a local mentor available all the time. If you try to grow in experience on your own, you may never move forward - in fact, you may get worse rather than better. Without a professional colleague, you may fall into the trap of thinking, "It's all my fault" when something unexpected happens in your search. If the same "mistake" happens multiple times, you may eventually give up experimenting and retreat into your comfort zone. But if the reason behind your "mistake" is explained to you, by someone more experienced, then you will learn and begin to move forward. That is why I believe that every novice searcher must develop their own professional network - a group of colleagues whom you trust and respect, and can help you to move from "I made a mistake" to "I understand what happened" to "I know how to avoid that in the future".

Finally, a good quality searcher is made over time. The more often someone does search work, the more likely they are to come across an unforeseen situation, and have to work their way out of it on the way to the final solution. This means that experienced searchers are never made overnight, by intensive education, but over a long period of time, making many mistakes, recovering from them, learning from them and getting better and more confident at being able to handle the next task. Happy searching!

References:

[1] Williams, M. E. (1987/1988). 'Defining information science and the role of ASIS.' Bulletin of the American Society for Information Science, 14(2), 17-19.

[2] Pausch, R. (2008). The Last Lecture. New York: Hyperion Books. ISBN 978-1401323257.

[3] www.worldofquotes.com [Accessed 2015.08.03]

特許調査の効率性改善―電子情報時代における教育の役割と人間性要因（抄録）

Stephen Adams

1 はじめに：「今日では全員がサーチャーだ」

必要な情報が電子媒体で創りだされ蓄積される時代である。「自然言語」で入力すれば「適切用語」でランキングされる賢いソフトに注目されがちである。（a）情報の形、（b）調査の技術解決法、（c）アクセス容易性の三つに対して開発すれば、情報の所在を見つけ、その情報を活用することも解決できるだろうと思われている。Yahoo のような検索エンジンが何千件もの回答をヒットさせるため、良きサーチャーであることがなんと難しいことか。

2 プロサーチャーの違う点は何か

この論文の狙いはプロサーチャーの教育法を述べることにある。プロサーチャーの減少要因は調査結果の高品質が足りなかったためだろうか、それとも、調査技術が改善された影響のためだろうか。家庭で行う「日常」調査と共通することも多いが、プロサーチャーの違いもあることに気付くべきである。

例えば、殆どスキルが要らない「日常」インターネットサーチャーは、インターネット情報はその情報品質が保証されていないことに気づく。しかし、それを無意識のまま、情報リタラシースキルを会得したと錯覚してしまう。だが、プロサーチャーなら、情報源が信頼に値するかどうかを最初に確認する。

第二の違いは、プロサーチャーは調査対象分野の専門技術への理解にまず努力する点である。調査を迅速にするための最新ハードウエアが、複雑な概念検索が、ランキング手法が、60 年前からある Boolean 検索より優れているとは限らない。私たちは完全な理想的な情報源とシステムで検索しているのではない。妥協の産物で検索していることを知るべきである。プロサーチャーは、これらの欠点を補完するために、複数を工夫しながら組み合わせて利用している。

プロサーチャーの第３の違いは、キーボードで操作している側の人間（能力）の違いではないだろうか（仮説）。三本足の椅子は、その１本がなければ役に立たない。だからこそ、このキーボードを操るプロサーチャーの教育と訓練こそが重要なのである。

3 JOB トレーニングはどうようにやるべきか

商用 DB の教育は歴史的にみてもプロバイダーが適切に行ってきた。しかし、無料の Tool が提供される従い、この歴史的な教育訓練が手抜き化されつつある。「知らない点が何であるかも知らない」という「真空状態」で検索をしている。例えば、US 特許に対する「自称熟練サーチャー」と話をしてみて、検索コマンドのことは熟知しているが各国の法制度とファミリー特許のことを曖昧に漠然とか知らないことに驚かされた。頻繁に使う機能は知っているが稀に利用すべき重要なことを知らないという危険な状態に陥っていた。サーチャー経験が長くなればなるほど、新しいことを学ぼうとしなくなり、「居心地の良いところ」に留まる危険性がある。系統的な教育訓練こそ定期的に必要である。

4 より系統的な教育訓練法とは

筆者の経験から、特許情報スペシャリストとして４つの観点の技能を備えているべきと考えている。

技術スキル：最良のサーチャーは検索領域分野の科学と

技術の専門用語に精通していること。

情報（科）学：「全ての人が今日ではサーチャーである」ということは科学分野においては真実ではない。情報蓄積と検索の正確な理解がなければ、まともな良い検索はとてもできるはずがないという信念（背景）が必要である。

特許法と手続き：「実践可能なインテリジェンス」を報告するためには、各特許書類の意味を正確に理解していることが特許調査の際に必要である。

ビジネス・スキル：プロジェクト管理のような広い分野での正しいスキルが必要である。

【４つの要素の詳説】極めて重要な筆者の解説なので、意訳抄録化をしない。一部メモに留める。スチーブン・アダムス氏のオリジナル英語解説文を直に精読することをすすめる。

4.1　技術スキル

サーチャーは自分が良く知っている分野では詳しく正確に検索できるが、知らない分野は幼稚な簡単な技術用語で検索しがちである。また、知らない分野では特に分野の最新情報に疎くなりがちである。依頼者が示唆した深い技術の専門用語の広がりが理解できなく見落としがちである。

一言でいうと下記の３つが実践できる必要がある。

1．顧客との信頼と良好関係が維持できる、
2．専門科学ＤＢにて高度な技術検索式を理解し正確な検索ができる、
3．適切かつ競合に負けない検索回答を自分で評価でき、かつ報告できること。

4.2　情報（科）学

情報（科）学の定義には色々あるが、役に立つのはウイリアム氏の定義である。　情報の生成・組織化・表現化・加工・配信・通信および、その活用の各段階にて発生する諸問題を解決することに耐えられるものでなければならない。

4.3　特許法と手続き

弁理士と同レベルの知見が求められているのではない。しかし､「特許性」調査と「特許調査」は別ものである。特許の「新規性」と「進歩性」は、少なくとも正確に理解すべきものである。特許法は頻繁に改正されるので、それに沿った調査が必要である。例えば、法的な日付である出願日、公開日、登録日は極めて重要である。特許権が生きているかどうかの判断にこれらは特に重要な日付である。引用と被引用特許、ファミリー関係もまともに正確に理解が必要である。どの特許が生きており、どの特許が直に関係するかを調べる権利化調査では「特許満了日」の計算予測ができなければならない。

4.4　ビジネス・スキル

特許調査に直接関係がなさそうなことでも、実際には大変役に立ちそうなことが、このビジネス・スキルなのである。例えば、政治、地政学、歴史、ビジネス、地域情勢、国際法、言語など諸々の事項が、実際には重要になることもある。これらの能力に対するサーチャー自身の教育は自己研鑽に帰するところが大である。それにも増して、これらの一般知見を習得する以上に重要なことは、「情報チームに役立つことを自ら他者から学び取る実践力」なのである。

5　完全実施化：経験と時間

前述の４つの観点の能力を備えたとしても、まだ不完全である。４つの観点を包含する「経験」こそが　熟練プロサーチャーを育てている真実要因である。ダン・スタンフォード氏が述べているが、「想定外のことが起きた際に会得するのが経験である。完全と思っていた検索戦略が間違っていることが判った時にこそ、経験のあるサーチャーは、より良きサーチャーに脱皮して生まれ変わるのである。」

最後に、良い品質の結果を出せるサーチャーは長い年月を掛けて養成される。検索する回数が多い程、予想外の状態に遭遇する機会が多くなり、最終の解決策に至る過程にて、良き経験が養成・蓄積されるからである。何度も失敗して、何度も再起して次なる仕事を達成できるようになる。これこそが「幸福な検索」なのである。