The Adler Museum of Medicine was founded in 1962 and was situated in the grounds of the South African Institute for Medical Research, Johannesburg. It is now housed at the University of the Witwatersrand’s Medical School Campus in Parktown, Johannesburg.

In June 1974 the Museum’s co-founders, Drs Cyril and Esther Adler, presented the Museum to the University of the Witwatersrand which named it the Adler Museum as a token of the esteem in which the founders were held by the University. In addition, the University bestowed the degree of Doctor of Laws (honoris causa) upon Dr Adler and the degree of Doctor of Philosophy (honoris causa) upon Mrs Esther Adler. Until Esther Adler’s death in 1982 she was the Museum’s Honorary Curator while Cyril Adler acted as Honorary Director of the Museum. From 1982 Dr Cyril Adler was appointed by the University as Director/Curator of the Adler Museum, a post he held until his death in 1988.

1975 saw the inception of the Adler Museum Bulletin, the brainchild of Mrs Rose Meltzer. Mrs Meltzer produced the first edition single-handedly and she continued to edit it until her retirement in 1991 and was editorial consultant until her death in 1992.

The Museum contains interesting and invaluable collections depicting the history of medicine, dentistry, optometry and pharmacy through the ages. Items of medical historical interest on display include microscopes and other scientific instruments, early bleeding and cupping equipment with an exquisitely crafted incision knife, ceramic pharmacy jars dating back to the 17th century, a collection of bone china and ceramic feeding cups, some dating from the 18th and 19th centuries, an early 19th century wooden handled amputation set in a wooden case, diagnostic and surgical instruments, treatment apparatus such as one advertised as ‘Patent magnetic electrical machine for nervous diseases’ used by Queen Victoria to ease her rheumatism (19th century) and the first electrocardiograph machine (1917) used in the Johannesburg General Hospital, the original artificial kidney machine used in South Africa, early anaesthetic apparatus, ear trumpets and brass ear syringes (early 20th century), hospital and nursing equipment and medical ephemera.

There are reconstructions of an African herb shop, a patient consulting a sangoma (traditional healer), and a 20th century Johannesburg pharmacy, a doctor’s consulting room, a dental surgery, an operating theatre and an optometry display of the same period. A history of scientific medicine is augmented with displays of several alternative modalities. Other attractions range from a reconstruction of a patient being treated by the famous Persian physician Avicenna to an exhibition of early electro-medical equipment, and a collection of rare iron lungs.

A showcase containing new acquisitions to the collection is constantly changed as donations are received. The objects displayed provide an insight into the range and diversity of the collection.

In the foyer outside the Museum are panels relating to the history of the Cradle of Humankind (Sterkfontein and environs) and a display of replicas from the site give visitors a fascinating glimpse into this world heritage site.

The Museum has a rare book collection and a significant history of health sciences reference library. An archive arranged by subject matter is housed in the library. Biographical information relating to thousands of medical and allied health professionals is available for research purposes which includes photographs, notebooks, academic certificates, records, personal papers and memorabilia of prominent health professionals and academics.

The Museum arranges public lectures, tours, temporary exhibitions and provides excellent facilities for health sciences historical teaching and research.

Opinions expressed in this publication are those of the authors concerned and do not necessarily reflect the views of the Editors, the Editorial Board or the Board of Control of the Adler Museum of Medicine.

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The Board of the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, has appointed the following members to serve on the Board of Control:

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ADLER MUSEUM BULLETIN

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From Manchester to Marikana

Professor JCA Davies

The flight distance from Manchester to Rustenburg (Marikana) is 9 130.43km. The time interval between Engels’ classic study of the working class in England and the Bench Marks study of Communities in the Platinum Minefields – Policy Gap 6 – is 170 years. When I read Policy Gap 6 and then Engels’ The Condition of the Working-Class in England in 1844 I realized the socio-economic kinship of the two studies. Hence, this essay.

Friedrich Engels, the son of a well-to-do cotton manufacturer, spent twenty years, 1849-1869, working as an employee, partner and director of a textile firm in Manchester founded by his father. Before joining his father he had studied The Condition of the Working Class in England in 1844, and in 1845 published his findings in German. He was then twenty-five years of age. The first translation into English was not published until 1886 in New York. One hundred and seventy years later I read a modern edition and it set bells ringing. Engels himself wrote in the preface to the English translation of his work “When I received, in 1886, the American papers with accounts of the great strike of 12 000 Pennysylvanian coal-miners in the Connellsville district, I seemed to read my own description of the North of England colliers strike of 1844”.

The Bench Marks Foundation published the results of its study Communities in the Platinum Minefields, the sixth in a series of Policy Gap Reports, a few months before the disastrous events at Marikana. In 2007 the Foundation had released a study of platinum mining in the North West Province called the Policy Gap, now referred to as Policy Gap 1. In 2011, as a prelude to embarking on the new study, “Policy Gap 1 was revisited to review whether there had been any changes in the behavior of these corporations [Anglo Platinum, Impala Platinum, Lonmin and Xstrata] with regard[s] to communities, on how to improve their social, economic and environmental performance within the framework of corporate social responsibility”.

Policy Gap 6 paints a grim picture of conditions in the mines and in the Bojanala District surrounding the mines. It would be foolish to attempt to reproduce this picture other than largely in the words written by the authors and condensed into an admirably concise executive summary.

“For Anglo Platinum, the study finds that despite making headway in achieving the goals set by the Minerals and Petroleum Resources Development Act related to the employment of historically disadvantaged South Africans (HSDAs), the employment of women and increasing HDSA procurement, significant challenges remain”. These challenges include the demographic profile of the workforce as a whole, changes in the workplace to accommodate the needs of women, audit of the Corporate Social Responsibility (CSR) projects to do with housing and share purchases. Compliance with environmental standards is also an area of concern.

“The main issues concerning Impala Platinum include high levels of fatalities at its operations, extensive use of sub-contracted labour, and damaging environmental impacts. The levels of fatalities are unacceptably high, and must be seen in connection with the push for cost containment, the use of subcontracting and the low levels of worker literacy. Impala Platinum has increased the number of sub-contractors it employs, and subcontracted labour is often poorly paid and poorly accommodated. Further, the lack of employment opportunities given to local youth is creating tension among the surrounding communities. Impala Platinum should further show greater concern for public safety in the communities surrounding the mine, by immediately setting up proper boom and bridges at the rail crossings that are now unguarded [an issue which has been discussed many times in the past – if my memory serves me right].

“In terms of environmental impacts, emission levels of SO₂ and CO₂ are too high at Impala Platinum’s Rustenburg operations. For CO₂ emissions, the Rustenburg operations account for over 70% of all of Implat’s CO₂ emissions. This means that the communities of the Bojanala District are bearing the heaviest burden of air pollution of all of Implat’s operations in Southern Africa.

“Regarding Lonmin’s operations some of the key problems highlighted by the report include a high level of fatalities, very poor living conditions for workers, community demands for employment opportunities and the impacts of mining on commercial farming in the area. Almost a third of Lonmin’s workforce is contracted labour, and
community demands for employment have lead to protests and unrest. The company was also in a union dispute, after which Lonmin dismissed 9,000 workers at the Marikana operations.

“Commercial farming in the area has been negatively impacted upon by the mining activities here. As the mines buy more land, the farms that remain become more isolated, and suffer under the environmental impacts of mining on the quality of the water sources in the area.

“One of the key challenges when assessing Xstrata’s CSR-programmes is that the company’s sustainable development report covers all its operations across the world, without breaking down the report to specific country levels. A source of tension between the local community and Xstrata is the perception among local residents that Xstrata is heavily reliant on contract workers from outside the local communities. This despite Xstrata’s claim to employ most of its workforce locally.

“Policy Gap 1 in 2007 found poor environmental management of water and waste behind Xstrata’s operations, but the current report shows a significant improvement on this point.

“For Aquarius the issue of local employment is also a source of tension with the local communities. Aquarius claims to have a minimum of 51% employed from the local communities, defined as the people living within a 50km radius of the mine’s operations. However, such a definition includes migrant labourers who are living in local communities, and so continues to be a source of tension. Further, Aquarius has a very heavy reliance on sub-contracting, employing 9,434 workers as subcontracted labour out of a total of 11,072 employees. The living-out allowance given to workers is linked to increases in informal settlements, a problem raised in the report in relation to most of the companies surveyed. Finally the report highlighted some of the problematic issues relating to Savannah Resources Consortium’s shares in Aquarius, given the links of this B[ack] E[m powerment] consortium to people with high-level political connections”.

In respect of Royal Bafokeng Platinum Limited “[O]ne of the key issues raised, especially in [the two settlements] Luka and Chaneng, is the contested ownership of land. The Bafokeng Land Buyers Association was established to contest the claim of the Royal Bafokeng Authority that all land was purchased by it as a single unit. Not only are the people of Chaneng contesting the land question, but they are also demanding a 30% ownership stake in the Stylidrift mine as compensation for having given up their land for its development. More tension is created by the lack of employment opportunities for local youth, as workers are sourced from outside of the local communities. Another issue that can lead to increased tension with the surrounding communities in the illegal desecration of graves in the prospecting for the new Stylidrift mine”.

The purpose of this lengthy quotation is to illustrate the extent and the complexity of the problem created by the rapid development of a number of mines by several different companies. It is clear that the many of the underlying faults are common to most of the companies.

Engels puts on record his déjà vu on reading press reports about conditions during a massive strike in the USA nearly 40 years after writing his account of the conditions under which working men and women and their children were living in industrializing English cities. When I read Engels’ classic account in the immediate shadow of the Marikana shooting, I felt that nothing had changed in the intervening one hundred and seventy years.

Listen to a short quotation from Engels: “Thus the social order makes family life almost impossible for the worker. In a comfortless, filthy house, hardly good enough for mere nightly shelter, ill-furnished, often neither rain-tight nor warm, a foul atmosphere filling rooms, overcrowded with human beings, no domestic comfort is possible. The husband works the whole day through, perhaps the wife also and the elder children, all in different places; they meet night and morning only, all under perpetual temptation to drink; what family life is possible under such conditions”.

A paragraph earlier Engels had written: “A class which bears all the disadvantages of the social order without enjoying its advantages, one to which the social system appears in purely hostile aspects – who can demand that such a class respect this social order?”

On 19 May 2014 the editorial in Business Day Live included this comment: “Even if the platinum mining companies agreed to workers’ demand for a R12,500 monthly wage for entry-level employees and the strikers returned to work on Tuesday, it would not represent a permanent solution to the problems plaguing the industry. The reason is that the underlying issues that triggered the strike and have sustained it for so long have not been resolved”.

Virchow, the pioneer pathologist and the founder of modern medicine, insisted that the causation of disease was as much social as it was medical. Pope Leo XIII, the author of the first great social encyclical titled Rerum Novarum, opened it with a stern criticism of inequality. Both these men were near contemporaries of Friedrich Engels.
The Hippocratic Oaths

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SUMMARY

The Hippocratic Oath is taken by physicians at the start of their professional careers. However, the text includes prohibitions that conflict with other texts of the Hippocratic Corpus. This contradiction troubles scholars, as they cannot understand the purpose of prohibiting medical acts, which are described in other texts and which are required for the proper treatment in several conditions. In order to understand this contradiction, we need to discover the relationship of the Oath to the overall content of the Hippocratic Corpus. In this connection, we explore the possibility that the Oath was not taken by persons who had concluded their medical training, but by those who were about to start it. This hypothesis is much more likely to be true, if there were two different oaths in the Corpus. And there are. We therefore need to compare the two texts in order to discover the truth about the Oath.

INTRODUCTION

Most of those who know the Hippocratic Oath, though there may not be many,¹ are likely to be either doctors or medical school students who assume that this is a unique text in ancient Greek literature. Furthermore, they probably think that the text bound those who were about to practise medicine in Greek antiquity. It is quite possible that these views do not correspond with reality. The text of the Oath reveals the ancient Greek ethos in medicine rather than a professional code² and provides simple principles with which to practice medicine.¹ The question arises, however, as to who took the Oath.⁴

PRESENTATION AND COMPARISON OF THE OATHS IN CORPUS HIPPOCRATICUM

First of all there are two oaths in the Hippocratic Corpus, one entitled simply OATH and the other entitled METRICAL OATH. Both oaths vary significantly. The first text entitled <ΟΡΚΟΣ> Jusjurandum ¹ (= oath) is the best known and is the following:

‘I swear by Apollo [the] Physician and Asclepius and Hygieia and Panacea and all the gods and goddesses, making them my witnesses, that I will fulfill according to my ability and judgment this oath and this covenant:

¹Hippocrates c 460 – c 370 BC
Height: 150mm
Collection: Adler Museum of Medicine
To hold him who has taught me this art as equal to my parents and to live my life in partnership with him, and if he is in need of money to give him a share of mine, and to regard his offspring as equal to my brothers in male lineage and to teach them this art – if they desire to learn it – without fee and covenant; to give a share of precepts and oral instruction and all the other learning to my sons and to the sons of him who has instructed me and to pupils who have signed the covenant and have taken an oath according to the medical law, but no one else.

I will apply dietetic measures for the benefit of the sick according to my ability and judgment; I will keep them from harm and injustice.

I will neither give a deadly drug to anybody who asked for it, nor will I make a suggestion to this effect. Similarly I will not give to a woman an abortive remedy. In purity and holiness I will guard my life and my art.

I will not use the knife, not even on sufferers from stone, but will withdraw in favor of such men as are engaged in this work.

Whatever houses I may visit, I will come for the benefit of the sick, remaining free of all intentional injustice, of all mischief and in particular of sexual relations with both female and male persons, be they free or slaves.

What I may see or hear in the course of the treatment or even outside of the treatment in regard to the life of men, which on no account one must spread abroad, I will keep to myself, holding such things shameful to be spoken about.

If I fulfill this oath and do not violate it, may it be granted to me to enjoy life and art, being honored with fame among all men for all time to come; if I transgress it and swear falsely, may the opposite of all this be my lot.’ (English translation: Edelstein, 1943.)

The ancient text can be divided into five conceptual sections in order to study its contents:

1. Ὅμνυμι...ξυγγραφήν τίνδε (lines 1-4): This is the prologue where the verb “swear” precedes and is followed by the mention of the divine forces, in whose names the vow is committed (Apollo, the god of health and endemic diseases, Asclepius, supposed son of Apollo, and two females of his seven children, Hygeia, in Greek Υγεία or Υγιεία (= health), who was associated with purity and prevention, and Panacea, in Greek Πανάκεια, who represented the concept of treatment for any illness. After these names, there is a general mention (not by name) of all the other gods and goddesses associated with health. Interestingly, in this part of the text is also the expression κατὰ δύναμιν καὶ κρίσιν ἐμὴν (= according to my ability and judgment), which indicates modesty and humility, but it also recognises the limitations of human power. At the same time, it focuses on human logic and judgment, removing the concept of healing from the divine realm. Also interesting is the use of the word ξυγγραφήν, because it can be translated as “covenant” or as “text”. So in fact we cannot be sure about the meaning of the word and therefore we should not speculate as to the existence of a medical professional guild which is rather risky in this context. The true meaning of this passage is more likely to be the prevention of the spreading of medical knowledge as divine property and therefore not all people can have it. Let us not forget that medical knowledge was protected in sanctuaries for centuries and then began to be taught in secular medical schools, such as Kos and Knidos. Never-less medical knowledge still needed to be preserved according to previous tradition.

2. ἡγήσασθαι μὲν τὸν διδάξαντά… ἄλλῳ δὲ οὐδενί (Lines 5-12): In this section the person under oath is bound by respect to his teachers. More than that, the teachers are equated with the person’s biological parents and they are considered as participants in his life. He is also obligated to teach the children of his teachers the art of medicine, unpaid and without a written agreement, in contrast to all other potential students. The written agreement should be regarded as the agreement between the teacher and the student that defines the parameters of the education. It protects both of them, but most of all it engages the learner and seeks to ensure his good performance. The obligations towards the teachers raise our interest as a major and perhaps excessive engagement. How reasonable is this for professionals, after completing their studies? This section may have a purpose at the beginning of training, but not at the end of it. Moreover, this part does not exist at all in the text of the Metrical Oath, as we will see later.
In this section we find the obligations to patients, which have caused most questions, as there are a lot of contradictions in relation to other texts of the Hippocratic Corpus. These obligations are:

A. To help and not hurt, according to his ability and judgment (lines 12-13): The expression focuses on helping patients. This is the principle of beneficence towards patients. The repeated labelling of finite forces and judgment suggests uncertainty. It may also be an excuse, so that there are not high expectations of the affiant person. Reasonably this leads to the conclusion that whoever admits this cannot be a physician with confidence in himself or trusted by the others. Therefore the person bound by this oath is probably not a physician yet. Our interest is also raised by the use of the word Διαιτήμασι (= habits, lifestyle) instead of drugs, which can much more likely achieve healing. A regular physician has the right to treat patients with drugs, but the person operating under this oath does not have this right, so he therefore cannot be a physician.

B. Ban on use of lethal drug (lines 13-15): Why should there be a prohibition like that? Was there any “custom” of euthanasia or suicide? Actually there was a “custom” of committing suicide, similar to what we regard today as euthanasia, on the island of Kea. Very old people had that choice. This information is recorded by Erasistratus, Testimonia politiarum, Fragment 4A, Line 5 and Testimonia et fragmenta, 3, 1-2. Menander, Strabo, Claudius Aelianus and Cassius Dio also confirm it. It is also mentioned several times by Galenus, Theophrastus, Dioskurides, Paulus Erotianus and Aetius Orbibassus. Otherwise why would a physician give a drug of this kind to a patient? If we exclude the case of error and deliberate lethal drug supply for personal reasons or as an accomplice to murder, no other case is left. In this text, these last two cases are not considered. Of course, things are different in the Metrical Oath, where only these last two cases are mentioned. Nevertheless, in this oath the affiant does not have the right to give such drugs.

C. Prohibition of using abortifacient drugs (lines 15-16): Even if we assume that it was common practice for women at that time, the person under oath should be absolutely uninvolved. However, in the Hippocratic Corpus there is a text referring to abortion, committed by a physician. So again we must assume that abortion was not forbidden entirely, but particularly for the person who swore this oath.

D. Prohibition of incision on sufferers by stone (λιθιῶντας) and referral to specialists (lines 17-18): In this case the male’s ability to father children could be endangered, there must be no involvement by the affiant. So the person under this oath has both the commitment and the right to be protected from the demands of patients and to keep himself and his medical art uncorrupted.

4. Ἐς οἰκίας δὲ ὁκόσας ἂν ἐσίω… ἄῤῥητα ἡγεύμενος εἶναι τὰ τοιαῦτα. (Lines 18-24): This section refers to home visits and focuses on the prohibition of any sexual contact and on the principle of confidentiality. A sexual relationship with the patient (or other person in his or her environment) is an abuse of the purity of medicine and its validity, while the principle of confidentiality indicates respect for the privacy of citizens. However, if we assume that the affiant is not a physician, how is it possible to make home visits? The answer lies in another treatise of the Hippocratic Corpus, Περὶ ευσχημοσύνης, 17, where the author advises the professional doctor to leave in the patient’s home a student of his to ensure that the doctor’s instructions are followed and to observe the progress of the patient.

5. Ὅρκον μὲν οὖν μοι τόνδε… τἀναντία τουτέων. (Lines 24-27): This is the latter part of the text. It completes the oath by counting the benefits of adherence, which is a good reputation, and stating that violation of it will result in the opposite. The negative results are not spelled out as the affiant has been informed and is aware of his obligations.

In conclusion, this oath was more likely to have been taken by apprentice doctors and not by graduated physicians, mainly due to the excessive expression of respect for the teachers and because of the prohibitions, which are obviously not applicable to qualified doctors, as seen from the other texts of the Hippocratic Corpus.
The text entitled ΟΡΚΟΣ ΜΕΤΡΙΚΟΣ (= metrical oath) in the manuscripts in Greek, Jusjurandum metricum in Latin (this text is also indicated by the note LINE 1 in TGL 13), is the following:

Αὐτὸν ἐν ἀχράντοισι μέγαν θεὸν αἰὲν ἐόντα (ὄμνυμι)· οὔτε τινὰ ξείνων δηλήσομαι ἀνέρα νούσῳ οὔτε τιν' ἐνδήμων ὀλοφώια ἔργα τελείων, οὔτε τις ἂν δώροις με παραβαίην ἔλεγεν ἐκτελέει πείσειε καὶ ἀνέρι φάρμακα δοῦναι λυργά, τάπερ κακότητα θυμοφθόρον οἶδεν ὀπάζειν, οὔτε χάριν φιλίης ἑτέρῳ κατανεῖμαι ὑποστῶ ἀλλ' ὁσίας μὲν χεῖρας ἐς αἰθέρα λαμπρὸν ἀείρων καὶ κακίης ἀμόλυντον κατὰ πάντα λογισμὸν μήσομαι ἔρδειν κεῖνα, τάπερ σόον ἀνέρα θήσει, πορσύνων πάνεσσι φίλην βιόδωρον ὑγείην.

The text can be translated as follows:

I swear to this ever-great god with impeccable words:
I will not hurt a foreign patient
Nor a local by performing deadly practice
Not if someone gives me gifts, he will convince me
To do painful breach and give poison drugs to a patient
Who knows that accompany stressful malice,
Nor I undergo to give (poisons) for the sake of love for someone
But by lifting up pure hands in the bright air
And by having every thought of mine untainted by malice
I’ll be thinking to offer those drugs that would save the patient,
By providing everyone with dear vitalizing health.

The texts of the Oath and of the Metrical Oath are both found in the Hippocratic Corpus and they are both written in the Ionic dialect, known as the dialect of sciences. The language (vocabulary, grammar and syntax) is quite similar in the two texts, although it is more poetic in the Metrical Oath. So we can assume that they belong to the same period. Never-the-less, they are distinguished by important differences in meaning.

1. Firstly, the titles are different. This element distinguishes the two texts in a way. Perhaps the Metrical Oath was written for physicians and the Oath for medical students. Of course, the Metrical Oath is closer to poetry, as the title indicates.

2. The Metrical Oath extends to eleven lines, in comparison with the Oath, which extends to 26½, making the Metrical Oath shorter and more succinct. So the commitments required by taking the Metrical Oath are less onerous, making the trust in the affiant’s integrity greater.

3. The Metrical Oath is given in the name of the "great god" (μέγαν θεόν) who obviously is Apollo, worshipped as the main god of healing and of endemic diseases, while no other divine name is mentioned, not even Asclepius. The invocation of gods extends in only one line against two in the Oath.

4. In the Metrical Oath the first and obviously most fundamental commitment of the affiant is not to cause harm to any patient whether foreign or a fellow citizen (οὔτε τινὰ ξείνων… ἀνέρα…οὔτε τιν’ ἐνδήμων, 2 - 3). This indicates that less diligence in the care of strangers is unethical and inconsistent with the integrity of the practice of medicine. In other words, the doctor should not act with bias or prejudice, especially when the patient is foreign. In this connection we assume that the physician would meet a lot of patients from other Greek cities, even foreign patients and people from different nations and places in his travels. A student would not have to worry about this, as he would not travel as a physician while in training.

5. Moreover, the person bound by the Metrical Oath is assuming the obligation not to offer deadly drugs to any man. In this verse there is the specificity (the only one throughout the brief and general wording of this text) that the incentive, which may induce such an act, is persuasion through gifts (...δώροις... πείσειει, 4-5). Also, the emotional and friendly bond may be the cause. The part with the obligations of the physician to his patients is contained within five lines (2 to 7) in the Metrical Oath, in contrast to the twelve lines (12-24) of the Oath. It is obvious that the affiant of the Metrical Oath has far fewer commitments and obligations, unlike the affiant of the Oath.

6. According to the Metrical Oath, the result of keeping this oath is the physical and spiritual purity of the physician (lines 8-9), while the mention of the sunlight reminds us of Apollo, who was also the god of light and in whose name this oath was taken. The same section of the Oath focuses on the reward of good fame, given by all people forever, and “punishment” in case of violating it is mentioned. The adding of the second part
reveals more trust in the affiant of the Metrical Oath and less in the affiant of the Oath. So the first one probably is still a student who cannot be trusted yet.

7. At the end of the obligations in the Metrical Oath, the affiant is committed to offer only what can save the patient. So he will provide health, which is dear to all (lines 10-11). In this passage the word σόον may allude to both “salvation” and “integrity.” Therefore, the word may reflect the prohibition of incisions, although this is not certain. If it does, this is the second specialization indicated in this text. If, however, the word does not mean the incisions, there is no contradiction with other texts of the Hippocratic Corpus, which are descriptions and recommendations of incisions. So the Metrical Oath does not commit the physician not to perform surgeries, while the Oath commits the student not to. Of course, the student does not have enough experience yet, while the graduated doctor has.

8. In the Metrical Oath there is no reference to female patients, in contrast to the Oath (Jusjurandum 1, 15-6, 20-1), which does make reference to women (“Similarly I will not give to a woman an abortive remedy.” And “...in particular of sexual relations with both female and male persons.” See Edelstein’s translation above.) This indicates women’s relatively low social value. There is also a difference between the two texts that indicates more confidence in the behaviour of the affiant of the Metrical Oath who appears to know better how to treat women and therefore there is no need to give him specific instructions.

9. All the above differences demonstrate that the texts of the Metrical Oath (Jusjurandum metricum) and the Medical Oath (Jusjurandum medicum) are not as detailed as the Oath and they do not refer to specialized cases. These cases are obviously left to the discretion of the physician to handle. Therefore this indicates more confidence in the physician’s discretion in the Metrical Oath, unlike the text of the Oath.

CONCLUSION

The texts entitled Jusjurandum metricum and Jusjurandum medicum, which are practically the same, are shorter and more concise than the Oath. They do not make specific mention about the physician’s behaviour towards patients and so they give him the opportunity to make his own choices. The only prohibition in these texts is to avoid damage to the patients. Of course, this is very general and it can include everything, physical, psychological or any other kind of damage. But the physicians are given the power to decide. Also no mention is made of the consequences of violation of the oath, which stresses even more confidence in the judgment of the physician. Indeed, the mien of the text exudes confidence in and the superiority of the person under oath. These differences between the Metrical Oath and the Oath suggests the conclusion that the Oath was written for people who were starting their medical education, while the Medical Oath was written for those who had completed their education and were beginning their professional careers.

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very important scholar, with a deep sense of the ancient Greek language, as shown by his comments and links made with other ancient Greek texts in an attempt to decipher the secret meanings of the Oath.


7. So many scholars have supported this hypothesis that it is believed to be true.

8. It seems that it was a custom to address a benevolent as father in antiquity. See Diodoros Sikeliotis. Nd. The Fourth Book (30, 2, 6-7). Translated by Tsaknakis AA, edited in Greek by Bilio...bardia, Thessaloniki.


13. In ancient Greek literature there is another oath titled ΟΡΚΟΣ ΙΑΤΡΙΚΟΣ (= Medical Oath), the text of which shows only small structural differences from the previous one, without any changes in the meaning. The only important difference between the two texts is that ΟΡΚΟΣ ΙΑΤΡΙΚΟΣ displays an additional row, the 7th one, missing in the version labeled Jusjurandum metricum, and which was probably added in Jusjurandum metricum after the comparison of the two versions. The text titled ΟΡΚΟΣ ΙΑΤΡΙΚΟΣ is not part of the Hippocraticum Corpus. It can be found in TLG (there is the indication Line t after the title).


15. Iliad A 10, 50-6 and 147.

16. It is believed that after the 6th century BC the doctors traveled all over the Greek world to provide their services. The authorities of the cities paid them. See Cohn-Haft L. 1966. The Public Physician of Ancient Greece. Smith Coll, Studies in Ancient History, p 42.

What was known about Miners’ Phthisis in South African Gold Mines by 1930?

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This question was asked early in the discussion of what light historical evidence might be expected to shed on the accumulation of knowledge about occupational lung disease in the South African mining industry during the 20th century.

Proviso: Phthisis (tysis) is an archaic term used to describe chest disease, and wasting from other causes. It is derived from, or is, a Greek word meaning wasting. In ophthalmology, for instance, it is used to describe the shrinking of the eyeball (phthisis bulbi) following perforation of the cornea or rupture of the globe of the eye due to trauma. In the past, and in the mining context, it may have been used to mean silicosis or pulmonary tuberculosis or a combination of the two, particularly in the days when the distinction was not clear, referring, of course, not to the aetiology or histopathology of the disease but to the loss of body mass so common among workers in dusty occupations – thus miners’ phthisis, dust phthisis, grinders’ rot and so on. The term should be avoided nowadays, if possible. In quoting historical writings it is best to use the original wording and add editorial comment if clarification is essential, or if the meaning is not easy to infer from the context. At the time that the documents discussed here were written, the term ‘dust-phthisis’ was sometimes used to describe what we would call silicosis, and ‘infective-phthisis’ to mean silicosis with (plus) tuberculosis, or maybe to indicate tuberculosis alone in miners or other workers exposed to silica-containing dust.

It is also obvious that many people think that the distinction between silicosis and pulmonary tuberculosis became clear relatively recently. The evidence given to the Milner Commission (1902-1903) by Mr WCC Pakes includes the following: In the absence of quartz dust silicosis will not exist; indeed, cannot exist. One great difference has been pointed out between the symptoms of phthisis (i.e. tuberculous phthisis) and silicosis; in the latter the miner does not notice that he is ill until he is almost past work. A little shortness of breath perhaps, and some wasting. In tuberculosis, however, the patient is ill long before the lungs are extensively affected. The reason for this difference is undoubtedly to be found in the toxins or poison secreted by the bacillus in the one case, and in the absence of any soluble poison in the other.

A second and very important proviso: Professor Jock McCulloch, who wrote a book about silicosis, emphasized that at least until the 1930 Silicosis Conference almost all the data put forward from South Africa referred to white workers. From then on data on black workers refer to men in service, with the exception of Peter Allan’s work in the Transkei, until the late 1980s when work from the National Centre for Occupational Health (NCOH), initially focused on permanent disability due to occupational accidents and on a community-based study of amosite mining, began. Only after the Leon Commission did studies of migrant miners who had returned to their rural homes begin. White data was the shop window. The data for blacks was virtually non-existent prior to democratic rule.

INTRODUCTION

There was sufficient knowledge for the above question to be addressed constructively by 1930 for this was the date of the important Silicosis Conference held at the University of the Witwatersrand. It may be argued that to confine the discussion largely to the issues of importance in deep hard rock mines in South Africa, and to the knowledge gained by health scientists and mining engineers in South Africa, is a strategy for work avoidance. On the other hand if it can be shown that, as the mining industry developed, the new issues arising could be discussed constructively in the light of work carried out in this country, or easily accessible work abroad, this could prove persuasive.
In the course of this article lengthy extracts from the original documents are used to set out the position as it was seen at a particular time by a particular individual or group. Too much should not be made of unfamiliar manners of speaking or writing, or what may seem to be quaint expressions.

In the second decade of the 20th century two important events took place in South Africa, almost simultaneously, as a result of initiatives involving the mining industry in co-operation with government and/or academia. The first of these was the inspection of the Witwatersrand mines, and the report on them, by William Gorgas (1914), and the second the establishment of the South African Institute for Medical Research (SAIMR), Johannesburg, (first Director appointed 16 September 1913). These initiatives must, at the time, have reflected the mind of the industry as a whole, and likewise the participation by particular mining companies reflects their interest. The third scientific paper in the long series of papers and reports printed and published by the SAIMR is by the Government Analyst of the Transvaal, Dr John McCrae, PhD, FIC, and is titled *The Ash of Silicotic Lungs* and details the sizes of particles of silica retained in the lungs of men suffering from silicosis. It is dated 3rd March 1913. In addition it may not be widely known that Mr Samuel Evans, the chairman of the Crown Mines Company, through his interest in the work in Panama, was directly responsible for Gorgas’s visit to South Africa.

The hypothesis being tested in this article is that, by the time the [first] International Silicosis Conference began on 13th August 1930, the major issues were common cause, and that established knowledge, readily available locally, was detailed enough to make action to address the important issues ‘reasonably practicable’. The establishment of the SAIMR provided the foundation for convening the Silicosis Conference, and for the high standard of the South African contributions. In addition, it is possible to demonstrate progress between the alarm which led to the setting up of the Milner Commission and the 1930 conference.

Two sources of information on the scientific developments prior to 1930 have been selected:

Firstly, knowledge gained as a result of the work of Dr Anthony Mavrogordato, Fellow in Industrial Hygiene at the SAIMR and his colleagues, notably two pathologists, A Sutherland Strachan and FW Simson. The best reference to the early work of Dr Mavrogordato is publication No. XIX of the SAIMR entitled *Contributions to the study of miners’ phthisis* published in December 1926. In addition a Special Supplement entitled *Silicosis in South Africa* published by the Transvaal Mine Medical Officers’ Association in March 1931 is useful. It is an account of a symposium held on 23rd October 1930, on the histopathology, pathological anatomy and radiology of silicosis, probably purposefully designed to make available to the general body of mine medical officers what had been presented to the Silicosis Conference a few months earlier. It is very similar to the two papers presented to the conference under the title *The clinical pathology, radiology and symptomatology of silicosis*. [See below: Papers 9 and 10].
In addition the 1937 Report on the Investigations of the Miners’ Phthisis Prevention Committee brought together much of the investigative activity in the thirty years following the Miners’ Phthisis Commission, 1903. This commission was followed by a flurry of activity, including:

- General and Final Reports of the Miners’ Phthisis Prevention Committee. 1916 and 1919.
- Miners’ Phthisis Commission. 1921. This Commission dealt with details as to ‘Compensation’.
- The Miners’ Phthisis Prevention Committee was reconstituted in 1926 and produced a long (286 pages) and detailed report in 1937.

This list of Commissions and Committees serves to emphasize the comment in the opening chapters of the (Leon) Commission of Inquiry into Safety and Health in the Mining Industry, nearly sixty years later, that the Leon Commission was the first to look at the industry for thirty years, and that the previous one (the Marais Commission) had not completed its work. It had in fact, in its published report, dealt only with one of its terms of reference. There had, effectively, been no comprehensive commission of inquiry into health and safety in the industry between the final report of the Miners’ Phthisis Prevention Committee in 1937 and the Leon Commission in 1994-95.

Secondly, the scientific papers presented at the International Conference on Silicosis held in Johannesburg from 13-27 August 1930, under the auspices of the International Labour Office.

Present at the conference, representing the USA was Dr Albert E Russell of the United States Public Health Service. Dr Russell was the author of the first report about occupational lung disease among Vermont granite cutters. This is the first of a series of scientific publications documenting the successful control of silica dust in the industry and the consequent control of silicosis and tuberculosis. It is not clear why the South African scientists and mining authorities did not follow the template readily available in 1930 and updated at intervals until at least 1980. Dr Russell’s contribution also reflects the importance of technology change, from hand tools to powered tools for drilling, as was the case in Cornish tin mines.

A brief account of the salient features of the papers about silicosis on the Witwatersrand, which occupy 187 pages of the proceedings, follows:

1. Historical review of mining conditions on the Witwatersrand and the changes which have taken place since the early days of the fields. A.E. Payne, General Manager, Van Ryn Deep Ltd., Hans Pirow, Government Mining Engineer, and Frank Roberts, Technical Adviser, Transvaal Chamber of Mines. [pages 107-128]

As an overview or introduction to the mining/silicosis problem this paper takes a bit of beating. The abstract which precedes this paper expresses exactly the point made above that in the years before the Silicosis Conference a constructive dynamic existed. There appears, if one accepts the following passage at face value, to have been no trace of antagonism or conflict among the participants.

A review of mining conditions on the Witwatersrand from its inception to the present day is chiefly interesting on account of the rapid change which has taken place in these conditions and on account of the successive steps for the prevention of miners’ phthisis which the change in conditions has necessitated.

At no time in the history of the Witwatersrand was the eventual development of the industry fully foreseen. As new problems arose, new methods were called for, and the dust prevention campaign led to sustained effort and continuous research.

In order, therefore, to present a complete picture of the changes which have taken place in mining conditions generally on the Witwatersrand, it is
necessary to describe step by step the various phases through which the industry has passed. [page107]

Drilling machines (pneumatic drills or jack hammers) were introduced by 1892. It was this technological change which was largely responsible for the raised dust levels and the increase in lung disease. In 1896 just over 1,000 drilling machines were being used and by 1899 more than 2,000. However, the report says:

We find that following the disturbances which gave rise to the Jameson Raid in 1895 the Government of the South African Republic appointed in April 1897 an Industrial Commission of Enquiry to look into the position of the mining industry. The records of that Enquiry can be searched in vain for any grievance as to conditions of health, or suggestion as to disability arising from the method of mining the banket. [page 108]

The Miners' Phthisis Prevention Committee, appointed in February 1912, reported in March 1916 on its work up to the end of 1915 and finally in January 1919. The report says:

The material knowledge of the disease gained by this Committee was very great, but it may be said that in its conclusions it endorsed the already known fact that avoidance of the inhalation of air charged with injurious dust was the most important line of action towards the elimination of the disease [phthisis] amongst the operatives [drillers]. With this fact in view, it was recommended that single shift blasting should be introduced; and the legal and moral responsibility of all mine employees was stressed as to proper use of water for dust allaying purposes. [page 118]

The Committee gained accurate knowledge of the incidence of the disease by medical examination of miners and a careful examination of the silicotic condition of such men. Examination of the lungs of deceased miners gave rise to a knowledge of the size of the dangerous dust particles and this led to the introduction of apparatus for the measurement of dust in the mine atmosphere. [page 118]

At this point it is important to note that the amount of dust in the air of mines, measured roughly ten years earlier and quoted in the Milner Commission Report (1903), and the dust levels which appear in the British Report on the Health of Cornish Miners (1904) are expressed in grains per cubic foot and either milligrams per litre or milligrams per cubic metre respectively. This indicates that the method used was gravimetric sampling. In the context of the concern of both Commissions with the health of miners this probably indicates that the shift to other methods of measurement was the result of concern with the location of dusty areas rather than the measurement of the exposure of individuals. There are eleven measurements in Appendix D of the Milner Report giving the date, weight of dust per cubic foot of air, the location at which the sample was taken with measurements, and the conditions or operation being carried out.

At the same time it was first mooted that a careful selection of recruits amongst the white miners would be an important preventive measure. It was also suggested that main travelling shafts should be downcast and men should be kept out of upcast shafts after blasting 'until the air is free from dust and fumes'.

Matters discussed in this paper include: employment numbers by race; geology; depth of mines; shift work; living conditions; dust and dusty jobs; causation of silicosis; drills and drilling; mining regulations; tuberculosis; etc. This is a very dense and informative paper. It has a common author (Hans Pirow) with Paper No. 6 and as a result there is some overlap.

2. The nature and source of dust in mine air, together with a brief reference to those operations which produce dust. A.F. McEwen, Chief Chemist and Secretary to the Transvaal Chamber of Mines, and J. Buist, Senior Dust Inspector, TCOM.

The authors discuss the nature of the rock from which the dust is formed, and quote chemical analyses from the Far East Rand (hanging wall, reef and footwall), Central Rand (country rock and reef) and West Rand (country rock and reef). There are seven levels for silicon dioxide of which the lowest is 62.13%; one is above 90%, four between 80% and 90% and one between 70% and 80%. These are very high levels indeed – the text does not tell us how much of the SiO₂ could be derived from silicates. The dust in the mine air, sampled using sugar tubes, contains 80.69% SiO₂ (the same proviso applies). The sources of dust are listed as blasting, shovelling of broken rock, the movement of rock in ore passes, ore bins and the like, machine drilling and hand hammer drilling. It is interesting to record that dust levels at tips and loading boxes remained a problem until the end of the COM dust surveys in 1983-85. That report of the Chamber of Mines says:
The mean dust at tips and loading boxes (average 171 p/m³) is the highest value recorded for the last six surveys [since 1974-75] and for the first time has exceeded the value for stopes.

At the end of the article there are two tables giving the dust levels as measured by the officers of the Chamber of Mines and those measured by the Mine Dust Inspectors (probably the early version of what we would call the DME). Accepting that the sugar tube method was soon shown to be less than satisfactory due to its failure to select particles of the sizes that really mattered, these tables show a consistent year on year decline in the total weight of dust suspended in a cubic metre of mine air between 1915 or 1916 and 1929. The two tables show broad agreement between the two agencies doing the measuring.

Matters discussed in this paper include: the use of water to control dust in various situations with measurements; analysis of mine water; and methods of handling broken rock.

3. Methods for determining the dust in mine air as practised on the Witwatersrand. James Boyd, Secretary, Anglo-American Corporation of South Africa.

The first determinations of dust in mine air were carried out for the Miners’ Phthisis (Milner) Commission in 1902, showing dust levels highest in a drive and in a raise. No systematic surveys were done until 1913. The first survey was done at the request of the Miners’ Phthisis Committee. The figures quoted were the same as those in the previous paper and the conclusions, derived from sugar tube and konimeter measurement, are carefully argued.

The report says: It may be asserted that neither of the two methods of sampling dust in mine air used on the Witwatersrand are methods which can claim any scientific accuracy. The errors which can be, and are, introduced through no fault of the operator are such as to render any claim to real accuracy untenable. The gravimetric method, sampling as it does all sizes of dust in the air, can easily be made to show very serious dust conditions by the presence of a few large (in the microscopic sense) particles of dust, whilst innumerable small dangerous particles of very light weight will not be reflected in the results obtained. The difficulty of separating the gravimetric sample into large (in the microscopic sense) and fine dust is so great that it is not practicable in the ordinary routine work. On the other hand, as an indication of the dust conditions, the gravimetric method is useful and has done good work. The vast improvement in underground conditions on the mines of these fields can be traced to the results of gravimetric sampling as showing the conditions prevailing.

Despite its faults and errors, the fact that, by the same method as was used in 1914, the average dust content of mine air has fallen from over 5 milligrams to round about 1 milligram, is an indication of the good work performed as the result of using the gravimetric method to call attention to bad conditions.

The development of the konimeter in 1916 by Sir Robert Kotze, Chairman of the Miners’ Phthisis Prevention Committee, is described. The way in which it operates is detailed. There is a long discussion on counting particles and of the sources of error etc. In 1916 it was decided to appoint an official on each mine to investigate and report on the dust conditions, as it was recognized that the staff of inspectors appointed by the Chamber of Mines could not be expected to pay sufficient attention to all the working places on the mines. These inspectors were expected to pay surprise visits to see that things were in good condition.

The conclusion sounds rather similar to some of the discussions which have taken place recently about the konimeter. In the meantime we can say that by using both methods [gravimetric sampling and the konimeter] we can obtain results which, if interpreted [sic] in a relative manner, give us a good indication of the dustiness, and consequently of the dangerousness from a phthisis-producing point of view, of the air in the mines. By using these methods and remembering that neither gives accurate results, but rather results which are only an approximation to absolute accuracy, we can still hope for further improvement in the dustiness and ventilation of the mines.

4. Measures for preventing the formation of dust, and precautions designed to prevent persons inhaling such dust as may be formed, and the regulations relating thereto. Malcolm Ferguson, Chief Inspector of Mines, and Walter Scott, Assistant Consulting Engineer, Central Mining – Rand Mines Group of Mines.

Little, if anything, had been done in the way of taking precautions to prevent persons from inhaling dust before the sitting of the Miners’ Phthisis Commission in 1902-1903.
The finding of the Commission was that miners’ phthisis was contracted as the result of miners inhaling dust-laden air, and the disease was found chiefly among rock-drillers in development ends, especially when employed on raising.

Alongside a detailed examination of the problem to be prevented are set the regulations promulgated to abate the problem. The paper is best read in toto but the statement of the adverse conditions prevailing in the mines is worth quoting particularly in the light of discussions about the design of mines and the roles of upcast and downcast shafts.

Generally the adverse conditions which had to be overcome may be summed up as follows:
1) All men on the outgoing shift were not hoisted before blasting took place, and were in the mine for some time after blasting operations had taken place, and in many cases were exposed to smoke.
2) Some of the persons had to be hoisted in the upcast shafts, where conditions were bad.
3) The persons actually blasting were often unable to avoid the smoke from blasting.
4) Promiscuous blasting was practiced more or less throughout the shift.
5) The oncoming shift was lowered before the air was sufficiently clear.

It is important to note that in this paper there is a good deal said about working hours and the relationship to the health of miners of long working hours and extended periods underground. There is also an example of the use of dust measurements to prove the point that hoisting men via upcast shafts exposes them to much higher levels of airborne dust. As a result of the findings the practice was prohibited in 1917.

The juxtaposition of the preventive measures and the legislation in this paper makes it obvious that the regulations, though many, are reasonable and necessary. The impression given by the paper as a whole is that it is surprisingly modern. In the late 1980s there were a number of moves to relax regulations about hours of work, tuberculosis etc. Nothing is known (is it?) about the short or medium term effect of these changes on the health of workers except in the case of stabilization and the increasing age/exposure of miners.

5. The general question of mine ventilation and air renewal, including references to the heat and humidity problems. G.A. Watermeyer, Professor of Mining, University of the Witwatersrand, and J.P. Rees, Dust and Ventilation Officer, TCOM.

This is the last paper dealing with environmental control (dust measurement and engineering). Significantly, and once again in an unexpectedly modern paradigm, these matters have been given precedence over medical matters. The title of this paper also signals the coming shift of emphasis from dust to cooling.

It begins by stating what is an important but not very obvious fact that by 1930 [t]he ventilation of the mines of the Witwatersrand is now almost universally produced by means of fans. The importance of this was pointed out to me by Mr Michael Martinson, and it serves to remind us again that the dominance of medical matters tends to skew the argument. Presumably by 1930 the mines were down to great depths – if I remember correctly when I was a schoolboy in the 1940s the mines on the Witwatersrand were already at ten thousand feet below surface. Reading the paper makes it clear that the underground workings were also very extensive and that distances (to the ends of the main drives and therefore to the stopes where work actually took place) were considerable. There is early reference to the committee appointed jointly by the Government Mining Engineer and the Transvaal Chamber of Mines to consider methods of ventilating dead ends, particularly with the object of reducing the dust during drilling time to a minimum. The text of this paper makes it clear that the depth at which mining was taking place and the rock temperatures encountered led to a shift in priorities.

The five papers reviewed above comprise what might be called the non-medical part of the South African contribution. Has enough been written above to support the tentative conclusion that no important matters are omitted and that if all the matters discussed had been attended to consistently over the next sixty years the health status of the men leaving the mines to return to labour-sending areas would have been much improved? What do we know now about the adverse effects of working at great depth in hard rock mines that we did not know sixty or seventy years ago?

This is the beginning of the medical tour de force:

6. A review of the history of silicosis on the Witwatersrand goldfields. L.G. Irvine, Chairman, Miners’ Phthisis Medical Bureau, A. Mavrogordato, Fellow in Industrial Hygiene, South African
Institute for Medical Research, and Hans Pirow, Government Mining Engineer.

The opening paragraphs of this paper are worth quoting in full, if only to reinforce my insistence to Professor Irving Selikoff many years ago that one should always begin with the mineralogy. At the cost of seeming to introduce an irrelevancy, a contemporary issue is the admixture of tremolite with chrysotile in the asbestos ore bodies mined in Canada.

The Gold-Bearing Area of the Witwatersrand

Whenever mining operations are carried on on a large scale in silicious rock of “phthisis-producing type”, the menace of silicosis begins to appear so soon as the mining population has become a settled population, and especially is this the case where machine drills have been in extensive use.

Migrant workers never became part of a settled population – given this insight might it not have been logical to go and have a look at the health status of returned miners in the labour-sending areas? There was a precedent in Dr George Turner’s visit to Mozambique in 1906, and a sharp reminder from Professor S Lyle Cummins in the Report of the Tuberculosis Research Committee (1932) that it would be well worth while the mining industry itself to initiate, in its own interests, a system of medical ‘follow-up’ of the repatriated Natives and a continuance of the tuberculosis survey of the more important recruiting areas. Dr Allan has already accomplished so much in the way of preparing the ground that it seems a thousand pities that the opportunity for its extension should be lost.

Returning to the text of the paper: That is the common experience, and that has been our experience in South Africa. (Remember that this applies to white miners only.) The prominence which the problem of miners’ phthisis has assumed in this country has been due to the magnitude of the gold-mining industry, to the large number of miners whom it employs, and to its unique concentration upon a single large and continuous gold-bearing area. The problem has been at once larger and more sharply concentrated than in other countries, and the deaths and suffering caused by the disease have been more clearly apparent.

The gold-bearing area of the Witwatersrand extends for some thirty miles on either side of Johannesburg, the outcrop running roughly east and west, with the reef dipping to the south. The reef is a quartz conglomerate in a country rock of quartzite. Analyses published in 1916 in the General Report of the Miners’ Phthisis Prevention Committee give the complete composition of the original ore, and of dust found in the mine air. They show that the components of both are silica, silicates and pyrites. Dr. J. McCrae informs us that the probable order of the amount of free silica in the original ore is 75 to 80 per cent., but that in the dust, according to the published sample, it might be as low as 35 per cent. So far as the silicosis problem is concerned, it is only the very finest dust which counts, since only the minutest particles can be taken up by phagocytosis into the lungs. Dr. McCrae, in his brief but classical paper on ‘The Ash of Silicotic Lungs’ published some sixteen years ago [March 3rd 1913], found that the mineral particles present in the lungs of miners who had died of silicosis were practically all under 5 microns, and 70 per cent. were under 1 micron in size.

The objective of the paper is to trace briefly the parallel and inter-related development of occupational conditions, of local knowledge of the disease, its types and its incidence, of the general legal attitude towards the problem, and of the general preventive measures which have been adopted.

The Initial Period of Mining on the Rand from 1886-1889, a period of ignorance of the dangers of silicosis. The early workings were shallow outcrop mines removing comparatively soft ore. About 1892 large reciprocating drilling machines driven by compressed air were introduced. By the end of this period there were 100 mines working, hoisting about 8 million tons per year. About 2,000 rockdrills were working, all of the dry reciprocating type. The average stoping depth was 800 feet, but the maximum depth reached by 1899 was 3,400 feet (1,100 metres).

The Period of First Realisation of the Menace of Silicosis and of Tentative Preventive Measures 1901-1910, the awakening in response to the Report of the Government Mining Engineer (Transvaal) for the six months ending December 1901, and the resulting Miners’ Phthisis Commission appointed by Lord Milner in December 1902. The GME stated that of 1,377 machine men employed before the war, 225 were known to have died between October 1899 and January 1902 (16.3%, or a mortality rate of 73 per thousand per year). The calculated minimum
mortality rate for the Lesotho miners retrenched in 1998 studied by Girdler-Brown and al in the roughly 18 months since leaving the mine was 35 per thousand per annum.

The Milner Commission found a 15.4% prevalence of miners' phthisis, and in addition 7.3% of suspected cases. This prevalence of silicosis among working miners is not very different from that found in the recent study of a sample of working miners on a mine in the Free State. There was some controversy between the Transvaal and Cornwall but this paper concludes that [O]ne may believe that there was truth on both sides and the exceptional danger of rockdrill work in the Transvaal remained common ground. At the time local medical opinion was that the majority of cases were non-tubercular, but within a few years it was shown that tuberculosis was common in men referred from the mines who died in the Witwatersrand Native Labour Association (WNLA) Hospital, and a study published among the papers which follow this one (page 268) showed that of 543 deaths among men certified in life as having primary (895 cases; 1917-1920) or ante-primary (728 cases; 1920-1923) simple silicosis, a little over two thirds of the deaths were due to silicosis with tuberculosis in the twelve years to 31st July 1929. The authors include the dust measurements lifted from the Milner Commission's report which show that in stopes the air contained 14-32 milligrams of dust per cubic metre, in a raise 164 and at the face of a drive 192-424. The Commission stated that dry mining must as far as possible become wet mining, to which the authors of this paper added that this reflected contemporary opinion and indicated the main direction in which measures of dust prevention on the Rand have proceeded ever since.

The Milner Commission forms the first landmark in our local knowledge of the disease. The report of the commission is considered in some detail and its relation to the Cornish enquiry discussed. Dr JS Haldane is quoted as speaking from his experience in Cornwall, being emphatic that, in the majority of cases, including returned Transvaal miners, death was due to tuberculosis [meaning pulmonary tuberculosis]. This opinion was reiterated fairly forcefully by Sir William Gorgas in his report about ten years later. He said in 1914 [A]t the present time on the Rand most cases of miners' phthisis die from an incidental tuberculosis implanted upon a 'silicised' lung, rather than from silicosis itself.

In considering the type of silicosis prevalent at this period this paper argues that, in view of the high dust levels quoted above, it was the 'classical' type of silicosis, with heavy bulky lungs characterized by an excessive development of pathological fibrosis, which tended to obscure evidence of coincident infection, except as a rule in the terminal stages. This is a good illustration of the clinical difficulty faced in differentiating phthisis into distinct categories in the living subject, and may be part of the origin of the emphasis laid on autopsy findings in South Africa.

The Mining Regulations Commission was appointed in 1907 and reported in 1910. Major areas of interest to this commission were miners’ phthisis, the question of gassing accidents in the mines, and mine ventilation and sanitation. From evidence led to this commission it was found that the local mortality from phthisis during the years 1905 to 1907 had been approximately six times higher amongst underground workers than amongst other adult males on the Rand, but that the age period of maximum mortality fell somewhat later amongst the former, a feature which is recognized to be characteristic of ‘dust-phthisis’. At the close of this period in 1910 the number of mines working was eighty-four. These mines were hoisting nearly 27 million tons of rock per year. The white underground employees numbered over 10,000; coloured underground employees over 120,000. The average stopping depth was 1,100 feet; the maximum depth reached at this time 4,500 feet. Some 5,500 rockdrills were in commission: all or nearly all were of the dry reciprocating type.


This period begins with the publication of the new code of Mining Regulations in 1911, legislation dealing with hours of work underground (Act No. 12 of 1911), the introduction of a legal system for compensation of silicosis. A Miners’ Phthisis Board was appointed to administer the Miners’ Phthisis Allowances Act of 1911. In June 1911 a Miners’ Phthisis (Medical) Commission was appointed, consisting entirely of doctors to enquire into the prevalence of miners’ phthisis and tuberculosis on mines within the Union and to advise from a medical point of view on provisions for legal measures for compensation. The Commission reported the results of a general clinical examination of 3,136 working miners, supplemented by a special examination of 326 men, in which radiography was for the first time applied to the examination of cases on a fairly extensive scale by Dr. A. H. Watt, at the Simmer and Jack Hospital.
By these means the prevalence of definite cases of the disease amongst working miners examined was found to be about 26 per cent., with an additional 5.5 per cent. of doubtful cases. This is somewhat higher than that found in 1903. It gives no reason, however, to conclude that the situation had retrogressed since the earlier date; it probably merely reflects the result of a more extensive investigation.

Machine drillers were still the occupational group most affected, and the Commissioners concluded that, regarding this group, the statement made in the Report of the Transvaal Medical Society in 1903, that the working efficiency of a rockdrill miner working under present conditions would be impaired or even exhausted after seven to nine years work still held good. Although other occupational groups showed much lower attack rates, no class of underground workers, including supervisory staff, was free from serious risk of attack. The importance of the factor of tuberculosis in the course of the disease was fully recognized in the Report, in which it is stated that in at least the great majority of cases tuberculous infection becomes towards the end superimposed upon pre-existing silicosis. The Report adds that there has been undoubtedly since 1902-1903 a distinctive alteration in the predominant clinical type of the disease.

The average duration of underground service in the whole class showing the first definite physical signs of the disease was 8.2 years, and the average age of those so affected 35.5 years; for machine-men with South African experience only, the average duration of service was 6.1 years.

It was suggested that, for purposes of compensation, cases should be divided into three stages: early, intermediate and advanced, and that for the two latter a pension or annuity should be payable.

Pure tuberculosis was found to be comparatively rare amongst miners at work, and while the Commissioners were agreed that ‘miners’ phthisis’ was definitely an ‘occupational’ or ‘industrial’ disease, they were also agreed that pure tuberculosis could not be so regarded.

In 1912 the Minister appointed a Miners’ Phthisis Prevention Committee. This committee was chaired by Sir Robert Kotze, the inventor of the konimeter, and its terms of reference were to enquire into and report upon methods for the prevention of miners’ phthisis and to advise on the introduction of a systematic and uniform policy. This was seen as an authoritative and representative body, including mine inspectors, mining engineers and mine managers representing the industry, working miners, medical men and other technical advisers, which afforded an opportunity for continued close co-operation in preventive work between the Department of Mines and the industry.

The Miners’ Phthisis Act of 1912 introduced a compensation system, based on two stages of disease, the first in a miner who shows definite physical signs of miners’ phthisis and whose capacity for underground work is thereby not seriously or permanently impaired and the second in a miner who has contracted silicosis in a marked degree and whose physical capacity for underground work is thereby seriously and permanently impaired.

Period of the ‘Present Day’ System of Fully Systematised Detection and Prevention

The year 1916 was a cardinal year in the history of silicosis on the Rand. It was marked by two new departures – the institution of the Miners’ Medical Bureau, and the publication of the General Report of the Miners’ Phthisis Prevention Committee. From 1916 we may suitably date the ‘present day’ system of detection and prevention of silicosis on the Rand.

The paper discusses in detail the Miners’ Phthisis Act of 1916, the outcome of a Parliamentary Select Committee. Seriatim the following subjects are dealt with:

- The institution of the Medical Bureau, and the main functions thereof;
- Changes in the principles of legislation on miners’ phthisis;
- The general and final reports of the Miners’ Phthisis Prevention Committee, 1916 to 1919;
- Occupational conditions since 1916 and the present position;
- The chief factors in preventive policy since 1916 and their results. In this part the falling dust levels are recorded;
- The incidence of silicosis since 1916-1917;
- Some outstanding problems.

7. The aetiology of silicosis (dust-phthisis). A. Mavrogordato, Fellow in Industrial Hygiene, South African Institute for Medical Research.

It must have been unusual for an academic research unit to appoint a fellow in industrial hygiene. This appointee had worked in Dr JS Haldane’s private
laboratory at Oxford and at St Thomas’s Hospital in London before coming to the SAIMR. In this paper he is deliberately being speculative because I am before an audience, many of whom have traveled some six thousand miles to be present and are intimately acquainted with the subject. He is talking about the fact that dust is a mixture, not composed of a single compound or substance.

Let us turn to animate adulterants or micro-organisms. The distinction between ‘simple’ and ‘infective’ silicosis or dust phthisis in a phthisis-producing industry is as important as the distinction ‘clean’ and ‘dirty’ cases in surgery. In this disease disability and death are always associated with a greater or lesser degree of the infective element, but in some industries and in districts with a high prevalence of dust-phthisis the disease persists for a long time in the clinically simple stage and progresses but slowly, while in other districts and industries the infective factor comes in early, and often with the result that many cases show rapid progression even after the subject has given up a phthisis-producing occupation. Unfortunately, on the Witwatersrand we are confronted by the type of disease in which the infective factor is of great importance.

He then goes on to detail the threat to life posed by tuberculosis among miners with silicosis using the data cited above in the discussion of Paper No. 6. The tables referred to by Mavrogordato are copied at the end in Appendix A. In addition to the high death rate set out in the table on page 268 which needs no elaboration, there are ‘life tables’ showing the proportion of cases which have NOT progressed to a more advanced degree of disability due to pneumoconiosis alone or acquired tuberculosis. Mavrogordato states in the text that the data on which the graphs are based are taken from the reports of the Miners’ Phthisis Medical Bureau, 1920-1922.

Ante-primary silicosis is regarded by us as the earliest stage at which we can recognize a dust-phthisis as a specific entity. ... After six years only 156 [of 473; 33%] survived as ante-primary silicosis, while 107 [22.6%] were dead – in the great majority of cases, of tuberculo-silicosis. The remaining survivors have progressed beyond the ante-primary stage, although nearly all of them gave up underground work on these mines when they were notified as suffering from the disease.

In the case of simple silicosis only just over 30% survived as simple silicosis for nine years. The progression curves and the death curves are compared for the two degrees of silicosis. There is no gain in ability to arrest the disease for the lesser degree group, i.e. the ante-primary cases, but there is a gain in expectation of life.

The association between tuberculosis and dust-phthisis is proverbial, but the variation in the part played by tuberculosis is almost equally proverbial. The paper concludes: When dealing with the aetiology of silicosis or dust-phthisis:

(A) One considers intensity, duration and continuity of exposure to phthisis-producing dust.
(B) One remembers that the association of adulterants animate and inanimate may influence both the production of the disease and its type.
(C) One fears that a high humidity favours infection by prolonging the life of pathologic organisms outside the body and facilitating their entrance into the body.
(D) One asserts that infection in a phthisis-producing industry should be thought of as it is thought of in a surgical ward or operating theatre.
(E) One feels that if a pastoral or industrial population is to turn to industry, they should think twice before turning to a phthisis-producing industry.

8. A preliminary study of the pathology of silicosis as seen on the Witwatersrand. A. Sutherland Strachan and F.W. Simson, Pathologists at the South African Institute for Medical Research.

I have said, and repeated, that much of what one reads in historical documents is surprisingly modern. Teachers of occupational health are familiar with the modern teaching in connection with the defence mechanisms of the lung in relation to dust. Most would agree that this paragraph is identical to what is taught today.

Several factors may play a part in breaking down the defensive mechanism [of the lung]; of these infection producing desquamation of the upper air passages is an important one, while a great increase in the dust content of the inspired air may be another. In an atmosphere loaded with particulate matter, the filtering mechanism of the nose and nasopharynx is overcome, the lining epithelium of the upper air tubes becomes clogged and the air entering the alveoli contains relatively large amounts of dust. In our cases of silicosis both factors mentioned play a part, but the dominant one appears to be the great increase in the inspired
air of respirable particulate matter. The greater part
of the dust which finally reaches the alveoli,
according to most authorities, is of a size
comparable with that of pathogenic bacteria.

In reaction to the invasion of the alveoli by dust,
phagocytosis is the essential feature and this is
associated with proliferation of the lining epithelial
cells, which become detached from the walls to
form the alveolar phagocytes.

This paper deals seriatim with the anatomy, in
particular the lymphatic system, of the lung; the
development of simple silicosis; the development
of the silicotic nodule; changes in the pleura; changes
in lymph glands; the macroscopic appearance of
the silicotic lung; the distribution of lesions;
complications; and the experimental investigation
of tuberculous infection in silicosis without overt
tuberculosis. It would be tedious to attempt to précis
the whole paper, but the summary makes
interesting reading, and includes all the major
issues pertinent to our present concern.

1) The site of the silicotic lesions in the lungs
appears to have an anatomical basis. This is
related to the positions in which lymphoid
tissue has been described.
2) The first evidence of change in the lung as a
result of the inhalation of irritant dust is a ‘dry’
bronchitis.
3) The manifestations of the silicotic process
appear first in relationship to terminal
bronchioles, vestibules and atria.
4) The silicotic process is a fibroblastic reaction
followed by a dense fibrosis of nodular type, in
which fat accumulation occurs in all stages and
increases pari passu with the size of the nodule.
5) Massive fibrosis may result from the progress of
uncomplicated fibrosis.
6) Infection modifies the silicotic process in the
direction of excessive fibrosis.
7) The important infective factor is tuberculosis.
8) The macroscopic changes are usually seen, first
in lymph glands then in pleura and lung
substance.
9) The main complications are related to
tuberculosis; others present are chronic
bronchitis and emphysema.
10) Silicosis may exist and progress without
superimposed tuberculous infection.

The discussion of ‘infective silicosis’ suggests that
the association of tuberculosis with dust exposure,
in addition to the well recognised association with
silicosis, was implicit or tacit by 1930.

In the lungs of miners who have worked underground
in a dusty atmosphere, silica particles may be present
in considerable numbers without producing
macroscopic or microscopic silicotic nodules. The local
resistance of such a lung is so lowered that relatively
small doses of a pathogenic organism may produce
infection. Further, Mavrogordato has shown, in
experimentally dusted animals, that an unresolved
pneumonia occurs in a proportion of cases when the
animals are subsequently exposed to infection by
organisms other than the tubercle bacillus. This may
explain the relatively frequent occurrence of
unresolved pneumonia in native miners, whose lungs
show little or no evidence of silicosis. These
manifestations are not included in the group
‘infective silicosis’ though they may be due to the
modification[s] of the infective process by dust.

This, of course echoes Gorgas’s contention a decade
or more earlier that the Rand miners died of
tuberculosis superimposed on ‘silicised’ lung, rather
than of silicosis.

Also of interest is the unvarnished statement that
chronic bronchitis and emphysema (in modern
parlance chronic obstructive pulmonary disease)
are complications of dust inhalation, and the
suggestion that the place of silicosis as an
aetiological factor in carcinoma of the lung
[should] be kept in view. These two comments
(about COPD and lung cancer) are guaranteed to
make the majority of modern occupational health
practitioners sit up straight.

There are some very good photographs at the end
of this paper – in the AJ Orenstein Library for
Industrial Medicine at the NIOH there is
Orenstein’s personal copy of An atlas of the
pathology and radiography of silicosis which was
prepared for and presented to the members of the
1930 silicosis conference. This would make a
persuasive exhibit, to illustrate not only
understanding of the pathological process but to
demonstrate a high level of technical skill.

9. The clinical pathology of silicosis. L.G. Irvine,
Chairman of the Miners’ Phthisis Bureau, F.W.
Simson and A. Sutherland Strachan. Pathologists,
SAIMR.

10. The radiology and symptomatology of silicosis.
L.G. Irvine and W. Stewart.

These two papers seem to repeat a good deal of
what has been said already. They serve to
demonstrate no lack of medical expertise in the
field of pathology, and the photomicrographs are striking. The reproduced X-rays may have lost some detail but the brief comments adequately explain why the series of X-ray plates is arranged as it is.

I suggest it is reasonable to conclude that the foundations of a system to prevent occupational lung disease among miners had been well and truly laid by 1930. The necessary scientific information was available; the will was there and the social unity among the major players manifest; there was no shortage of ideas or good advice; practise elsewhere was reported at the conference from Australia, Belgium, Canada, Germany, in considerable detail from Great Britain, from Italy, the Netherlands and the United States.

In my opinion the critical neglect in the years following the conference was not to relate exposure to health effects. The missing bit of technology was the cyclone for separating particles by size, though a workmanlike job could have been done with the instruments available, as one of the papers argued. The second element was the failure to take into account the progressive or the relapsing nature of the two diseases of greatest importance, given the enormous size of the labour force and the pervasive adverse effects of the migrant labour system.

Regrettably it must be said that the absence of reliable vital statistics made it impossible to compare the mortality experience of miners or migrants with that of the general population as a matter of course – special projects would have been necessary.

Finally the focus on dust so evident prior to 1930 was lost in the concentration on cooling at great depth and the hectic pursuit of profit. If the tuberculosis case rate is the best measure of social progress in an industrial society then South Africa has failed miserably in public health terms, not only in the mining industry but in society at large.

From a historical perspective the failure to control dust and tuberculosis in silicosis producing industrial undertakings, among which gold mines are by far the most important, is only one of a series of public and occupational health failures in South Africa for which we are going to continue to pay a colossal price throughout the 21st century.

Postscript: It is relevant to draw the reader’s attention again to the fact that one of the delegates from the USA was Dr Albert E Russell, an Officer of the United States Public Health Service. He had just completed (as the first author) a report on the granite industry. (Russell AE, Britten RH, Thompson LR, Bloomfield JJ. (1929): “The Health of Workers in the Dusty Trades. II. Exposure to Siliceous Dust (Granite Industry).” Washington: USPHS, PHB No. 187.) His presentation is at pages 535-559 of the proceedings. The critical part from our point of view is on pages 541 on, including the table on page 542.

A report of a study made by the United States Public Health Service of the dust hazard in this industry has recently been published [reference above]. In this study it was shown that workers engaged in finishing granite were exposed to dust in the concentration of 40 to 65 million particles per cubic foot (i.e. particles less than 10 microns in diameter). The general plant atmosphere averaged 20 million particles per cubic foot.

The workers were grouped according to the intensity of exposure and are considered throughout the morbidity and mortality study in these groups. Groups A and B were exposed to averages of about 27 million particles per cubic foot [953 pccc], and the average for some in this group reached 60 million [2119 pccc]; Group C averaged about 20 million particles per cubic foot [706 pccc]; Group D averaged 10 million [353 pccc] or less. These figures may be converted to particles per cubic centimeter by dividing by 28,317 – the number of cubic centimeters in a cubic foot – or in round figures by 30,000.

There follows a sophisticated study of morbidity and mortality, and one of the graphs contrasts the mortality from tuberculosis among hand-pneumatic tool cutters and rural Vermont men. It is dramatic. Over the next fifty years at least ten additional studies or reports were prepared. The latest report on Vermont granite workers states that the results confirm previous studies that show that death rates from silicosis and tuberculosis, the major health threats in the years before 1940, were essentially eliminated after dust controls.

Though there was no delegate or observer from Scandinavia at the 1930 Silicosis Conference the Swedish authorities started a silicosis register in 1931, referring to South African criteria as part of the design. As a result there is now no silicosis in the dusty industries in Sweden.

When De Villiers Lambrechts4 did his dust survey as a co-operative project for the Pneumoconiosis Research Unit and the Anglo American Corporation in 1963 he recorded peak exposures of 5,000 pccc or 141 million particles per cubic foot or nearly two and
a half times the peak levels in Vermont in the 1920s. It's obvious from a reading of historical documents that the very serious occupational lung disease problems are a consequence of the failure to control dust in South African mines despite the fact that the know-how has been readily available for decades.

REFERENCES


APPENDIX A

The Immediate Causes of Death in Cases of Silicosis

We may suitably conclude this account of the clinical pathology of silicosis with the subjoined tabular statement of the actual causes of 543 deaths which have occurred amongst 1,023 cases originated certified as having "Simple Silicosis".

<table>
<thead>
<tr>
<th>Immediate cause of death</th>
<th>Originally primary stage cases: 543 deaths</th>
<th>Originally non-primary stage cases: 511 deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicosis with tuberculosis</td>
<td>(237) (43.5%)</td>
<td>(158) (61.9%)</td>
</tr>
<tr>
<td>Silicosis in secondary stage without obvious tuberculosis or other specified intercurrent disease</td>
<td>28 (7.2%)</td>
<td>7 (4.8%)</td>
</tr>
<tr>
<td>Influenza</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>10 (2.2%)</td>
<td>6 (6.4%)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other diseases of respiratory system</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Malignancy</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Diaphyseal fracture</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>General paralysis of insane</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Syphilis</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Acute respiratory infection</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Venous disease of heart</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other disease of heart</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Cancer of lungs (primary)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cancer of other sites</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Chronic rheumatism</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>General brain hemorrhage, etc.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other disease of nervous system</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Nephritis</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Other genito-urinary diseases</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Diseases of prostate</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Carcinoma of liver and biliary tract</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Intestinal obstruction</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other diseases of digestive system</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Deaths by accident or injury</td>
<td>14 (4.7%)</td>
<td>10 (5.8%)</td>
</tr>
<tr>
<td>Other causes</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Undetermined</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>572</td>
<td>171</td>
</tr>
</tbody>
</table>

* The percentages show are percentages of the total deaths.
A life-long relationship with John Barlow

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This article is an extension of the excellent tribute to John Barlow by David Jankelow in the June 2012 issue of the Adler Museum Bulletin. From my perspective as a colleague and close friend over more than 50 years, I will outline, through a series of anecdotes, aspects of my relationship with this remarkable man.

I first met John Barlow in London in the summer of 1955 when he and I qualified for the MRCP. I knew that he was at Hammersmith Hospital, working with my former science year classmate and friend Priscilla Kincaid-Smith on the response of systolic murmurs to vasoactive drugs. This topic was of particular interest to me.

I returned to South Africa in 1956 and was appointed medical registrar to Dr Evelyn Popper at the Non-European Hospital (NEH) next to the old Medical School in Hospital Street, Hillbrow, opposite the old Johannesburg General Hospital. I became an active participant in the Cardiology Division and the Cardiac Clinic at the hospital. My prior experience with phonocardiography enabled me to perform the phonocardiograms in the Cardiac Clinic in addition to consulting with patients. The Cardiology Division was headed initially by Dr Bernie van Lingen and later by Dr Maurice McGregor. Weekly meetings were attended by an enthusiastic group of cardiologists and cardiac surgeons. It was a wonderful experience.

In late 1957 I accepted the position of acting Assistant Physician to Dr Vernon Wilson, Chief Physician at Baragwanath Hospital. Dr Popper asked me to help her appoint my replacement at NEH. I heard that John Barlow had returned to South Africa, but had been unable to find a vacancy at the registrar level. I located him at one of the Chamber of Mines Hospitals. He replaced me as Dr Popper’s registrar in January 1958. He quickly made a mark in the Cardiology Division. Few of us ever challenged the opinions of the senior cardiologists until John Barlow joined the discussions. His training at the Royal Postgraduate School at Hammersmith Hospital under Dr (later Dame) Sheila Sherlock and Professor (later Sir) John McMichael made him a formidable adversary in discussions and earned him the respect of his colleagues and seniors.

In January 1959, Dr Popper asked me to return to NEH for a six-week period as acting Chief while she was on sabbatical leave. By then, I had decided to leave South Africa, and had received a Fellowship in Cardiology at Johns Hopkins Hospital in Baltimore, starting in July 1959. Being John Barlow’s chief was not an easy task; but it was the beginning of a life-long relationship with John Barlow.
friendship. Although we did not always agree on diagnosis and treatment, we developed a mutual respect for one another. One remarkable case is worthy of description. A robust man was admitted with the diagnosis of acute pulmonary oedema. We questioned the diagnosis of left heart failure because the electrocardiogram was normal and there were no apparent cardiac abnormalities on examination. When he developed a fever and his blood count showed a marked eosinophilia, we realised he had an unusual form of bronchopneumonia. He died within a few days. His widow informed us that several family friends living in the then rural Ferndale area of Johannesburg had been admitted to area hospitals with similar symptoms, and some had died. John and I made several visits to Baragwanath and Coronation Hospitals, reviewed the records of patients from the Ferndale area who had been hospitalised with similar symptoms, and noted the similarities between our case and the others. We also interviewed family members and friends of the victims in Ferndale. It was noticeable that the residents spoke freely when I was alone, but became silent when John was with me. Apparently they were convinced that John was a policeman and would not talk in his presence. All the patients had become ill after drinking beer at a shebeen. There was a strong suspicion that a rival shebeen queen had tampered with the beer on that night. We became aware of a similar epidemic reported in the South African Medical Journal (SAMJ) by Dr Max Patz of Middleburg, Transvaal, in which he postulated that the contamination of the beer was with Ascaris Lumbricoides ova. Our report was completed by John and our superb intern Wendy Pocock after I had left for Baltimore, and was also published in the SAMJ.\(^2\) John did not like the description of his image as a policeman.

Another anecdote about John’s versatility as an internist is recalled in an article by Lionel Schewitz published in the June 2005 issue of the Adler Museum Bulletin.\(^3\) Schewitz was a registrar in Obstetrics and Gynaecology at Baragwanath in 1958. He and Harry Seftel published an article on the surprisingly good outcome in pregnant black females with the nephrotic syndrome. In order to expand their observations to a larger cohort, they recognised the need for renal biopsy studies. This procedure had not, to their knowledge, been performed on pregnant patients in South Africa. John Barlow had learned the technique of renal biopsy at Hammersmith. He graciously came to Baragwanath and led Schewitz through the technique step by step.

I maintained a regular correspondence with John during my first few years in Baltimore. In August 1962, I made my first trip to South Africa since leaving in mid-1959. Soon after arrival, I visited John Barlow, now a key member of the Wits Department of Medicine under Professor Tom Bothwell. John’s desk was typically cluttered. He showed me his manuscript on “The Significance of Late Systolic Murmurs and Mid-Late Systolic Clicks”. He knew I had worked with Dr Victor McKusick in the spectral phonocardiography laboratory at Johns Hopkins Hospital, and that McKusick had just published an article in Progress in Cardiovascular Disease in which he suggested that late systolic murmurs and mid-late systolic clicks were extracardiac in origin, due specifically to a previous pericarditis.\(^4\)

I read John’s article with skepticism. Initially, I argued against the mitral valvular origin of the late systolic murmur and mid-systolic click, because it did not fit the haemodynamics of late systole. But after examining all the evidence, including the left ventriculograms, I was convinced that John was correct. He was anxious to get the article into print as soon as possible. I convinced him to submit the article to Circulation, which he did with much reluctance.

Imagine John’s reaction when he learned some months later that Circulation had rejected his article, because he had concluded, on the basis of only seven cases, that the late systolic murmur was always due to mitral regurgitation. He accused me, in language that cannot be printed, of very poor judgment. I was equally upset. I immediately suggested that he send a shortened version of the article to me, and I would publish it in the Maryland State Medical Journal, of which I had recently become the Heart Page editor. I also suggested that he submit the full version to the American Heart Journal, because the editor, George Burch, had a particular interest in heart sounds and murmurs. John accepted both suggestions. Thus the first publication of the condition now universally known as the “Barlow Syndrome” was in the Maryland State Medical Journal
In April, 1964, John made his first visit to the United States. He had with him a cineangiogram from a patient at Hammersmith Hospital, given to him by Wendy Pocock, who was then working at Hammersmith. She and colleagues had submitted a paper to the British Heart Journal, titled "Left Ventricular Aneurysms of Uncertain Aetiology.", although John was not a co-author, he was apparently not fully convinced that this was a ventricular aneurysm. He wanted the opinion of an expert angiographer. I introduced him to Michael Criley at Hopkins, who had collected several similar-lookng angiograms, which he had interpreted as related to the mitral valve. John spent hours with Mike and other Hopkins staff members reviewing angiograms. He was finally persuaded that the "aneurysmal protrusion" towards the left atrium was the posterior leaflet of the mitral valve and not a left ventricular aneurysm. Criley and colleagues coined the term "mitral valve prolapse". John opposed this terminology, preferring "billowing mitral leaflet syndrome". However, the terms "mitral valve prolapse" and "Barlow Syndrome" have prevailed.

I also introduced John to my former chief, Victor McKusick. Having by now fully accepted John's interpretation of the late systolic murmur and mid-systolic click, Victor invited John to present his work to a larger Hopkins audience at a Conjoint Clinic forum. I introduced John as "the gold beneath the white water's reef." John's presentation was published unabridged in 1965 in the Journal of Chronic Disease of which Dr McKusick was the editor. At that lecture John introduced the term "non-ejection click" for the first time, in preference to "mid-systolic click." Dr McKusick acknowledged the evidence that his own theory of the origin of the late systolic murmur was incorrect with extraordinary grace. He was Chairman of the Department of Medicine and Physician-in-Chief at the Johns Hopkins Hospital from 1973 to 1985, when he was named "University Professor of Medical Genetics". He came to be known as "the founding father of medical genetics" and died in July 2008 at age 86.

The first published article on what came to be known as the "Barlow Syndrome," Maryland State Medical Journal, February 1963.
I saw John regularly in the late 1960s and 1970s, usually during family visits to South Africa, and at times when John came to a cardiology conference in the United States. Our basic philosophies on the direction of cardiology diverged, particularly in the 1970s. I became an early protagonist of coronary bypass surgery, based on the excellent results my patients were experiencing. John was ultraconservative in this regard. We argued this issue every time we met, because I felt strongly that John was holding back the progress of cardiology in Johannesburg. Several prominent Johannesburg physicians were sending potentially eligible surgical candidates to me in Baltimore and to Dr David Friedberg in Milwaukee for consideration for coronary bypass surgery.

An example of this occurred in 1975, when my closest friend, a 50-year-old radiologist, was hospitalised after a syncopal episode. He was found to have recurrent episodes of ventricular tachycardia in association with classical “Prinzmetal” type electrocardiographic changes. His cardiologist, Dr Monty Zion, had recently become aware that this condition, also known as “vasospastic angina” and “variant angina”, could be effectively treated with the calcium-channel blocking drug nifedipine. Fortunately, nifedipine had just become available in South Africa, and it controlled the syncopel episodes very well in my friend. I was very familiar with the benefits of nifedipine in Prinzmetal angina, since I had been the first clinical investigator in the United States on the effects of nifedipine in angina pectoris. Although vasospasm occurs in patients without obstructive coronary artery disease, it can occur equally in patients with severe coronary obstruction. It was imperative, in my view, to determine whether this patient had normal or obstructed coronary arteries. He had been seen by several cardiologists, including briefly by John Barlow, and had not been advised to undergo cardiac catheterisation. I persuaded him to come to the United States for a heart catheterisation. He did so, was found to have severe triple vessel obstructive coronary disease, for which he underwent triple vessel bypass surgery. In addition, he had severe bilateral carotid artery stenosis, which inexplicably had not been recognised in Johannesburg, since he had very loud carotid bruits. Bilateral carotid endarterectomies were performed in addition to the coronary bypass procedures.

Another major disagreement between us occurred in 1979. It involved a general practitioner who had been my classmate and a Barlow patient for some years. His main complaint was shortness of breath. John had made a diagnosis of recurrent pulmonary embolisation with right heart failure and was treating him with anticoagulants and diuretics. The patient had a daughter in Baltimore and another in Israel. Since he was not improving, he decided to get an opinion from me and from Monty Zion, who had become Chief of Cardiology at Shaare Zedek Hospital in Jerusalem. I agreed with the right heart failure diagnosis, but an echocardiogram showed impressive thickening in the region of the pericardium. We therefore performed a cardiac catheterization and pulmonary arteriogram. The ventricular filling pattern was suggestive of constrictive pericarditis but not clearly diagnostic. I sent the pulmonary arteriograms to Dr Morris Simon, also a former classmate, who was Chief of Radiology at the Beth Israel Hospital in Boston, and a recognised expert in pulmonary arteriography. He said categorically that there was no evidence of past or recent pulmonary embolism. I recommended that the patient should undergo a thoracotomy, since there was a reasonable chance that he had constrictive pericarditis, which was potentially treatable. Dr Zion consulted with the patient in Jerusalem, and essentially agreed that the diagnosis was uncertain, and that a thoracotomy should be performed.

It came as no surprise that John Barlow disagreed very strongly with me and Monty Zion. When I visited Johannesburg in September of that year, I went to see him as usual, but with some trepidation. He led me down to a crowded conference room, where the pulmonary arteriograms were on display. He pointed to what he considered to be old embolic lesions in several branches. He harshly criticized American medicine in general, and Morris Simon and me in particular. John had received some training in radiology while at Hammersmith Hospital, so it was not a topic of argument for me. I made the case for thoracotomy, to which John subsequently agreed. The diagnosis proved all of us wrong. The patient had a malignant thymoma, from which he died some months later. The tragedy of this case is that the diagnosis should have been obvious, if only we (including John Barlow) had remembered the Osler aphorism that John so frequently cited: “If you listen carefully to the patients they will tell you the diagnosis.” This
patient had a history of myasthenia gravis, a disease well known to be associated with malignant thymoma. He told us, we heard, but we did not heed.

This incident rankled for a while, but was soon forgotten and forgiven. I did not visit South Africa during the 1980s, but did see John periodically at American Heart Association or American College of Cardiology meetings in the United States. John was at the peak of his fame in those years, but we usually found time to have lunch or tea and discuss South African politics and family matters. When I started revisiting South Africa during the 1990s, John had relinquished his position as Head of the Cardiology Department and Chief Physician at the Johannesburg Hospital. He retained an office as Professor Emeritus and Honorary Research Consultant and continued to consult until his death.

I had the good fortune of seeing John every year from 1990 to 1997. In 1997 I invited John to give the inaugural “Bernard Tabatznik Lecture in Cardiology” at Sinai Hospital in Baltimore. This honour had been bestowed on me for services to Sinai as Chief of Cardiology and Associate Chief of Medicine from 1961 to 1972. John readily accepted, and elaborate arrangements were made for the arrival of John Barlow and his wife Shelagh in Baltimore. A day before their scheduled departure, we received a call informing us that Shelagh was ill. John was never able to give this lecture, which is now in its 14th year. His good friend, Tsung O Cheng, Professor of Medicine at the George Washington University, presented this lecture in 2010 as a tribute to John Barlow, in which he reviewed the Barlow Syndrome in minute detail.

I saw John each year from 2000 through 2006, on one occasion in Winchester, England, where his son Clifford, a cardiac surgeon, and his grandchildren live, and where John retreated during the South African winter months. He had become quite depressed, and had suffered a series of personal mishaps and illnesses. At our last meeting in Johannesburg in 2006, there were tears in his eyes when we said goodbye.

John Barlow is the only Wits graduate included in the book “Profiles in Cardiology” by Willis Hurst, Richard Conti and Bruce Fye. The authors selected approximately 240 individuals over the last 600 years who have made major contributions to our understanding of the heart and circulation, upon which others have built. The only other South Africans selected for inclusion in this book are Christiaan Barnard, who performed the world’s first cardiac transplant, and Dennis Kriek, an electrophysiologist and former editor of the British Heart Journal. Both were graduates of the University of Cape Town. It has been said that John Barlow was one of the most highly regarded cardiologists of his generation in the world, an assessment with which I fully agree.

On reviewing the lengthy mail correspondence between John Barlow and me over the years, the comment I most cherish is from his letter of 28 May 2002: “I have much liked and respected you for more than four decades and it remains my intention – perhaps a pipe-dream – to deliver one day the lecture in your honour.”

REFERENCES

In March 2014 I attended a conference in Cape Town entitled History of Anaesthesia and Ethics Symposium hosted by the Cape Western Branch of the South African Society of Anaesthesiologists and the Department of Anaesthesia, University of Cape Town (UCT). It was billed as a unique symposium focusing on the rich historical heritage of the specialty of anaesthesia as well as a session on ethics and believed to be the first symposium of its kind in South Africa.

The symposium was held over one-and-a-half days. On the first day delegates had the opportunity to visit both the Heart of Cape Town Museum that focuses on the world’s first successful heart transplant operation performed by Professor Christiaan Barnard and his team, and the Nadin Parbhoo History of Anaesthesia Museum. Both museums are housed at Groote Schuur Hospital, the site of the historic transplant and both are well worth a visit when in Cape Town.

On the second day the business meeting was held at the Colleges of Medicine in Rondebosch. The keynote speaker was Dr David Wilkinson, President of the World Federation of Societies of Anaesthesiologists and a previous President of the History of Anaesthesia Society in the UK.

For those readers who may be interested in the details, the website is still operational. www.historyofanaesthesia.co.za

The Heart of Cape Town Museum probably needs little introduction to readers. Established to commemorate the first successful heart transplant in the world, performed by Professor Chris Barnard and his team on the patient Louis Washkansky on 6 December 1967, the museum was proudly shown off to delegates. It is located at Groote Schuur Hospital in Observatory and was founded in December 2007, marking the 40th anniversary of the transplant. The museum honours everyone who played a major role in the operation, including the donor, the operating team, the nurses and the recipient.

This accomplishment undoubtedly put Barnard, his team, the hospital, UCT and Groote Schuur, and indeed South Africa, on an international stage and people today still WEEP as they recount, step by step, the events leading to the operation and the operation itself. The museum is laid out in the old main building of the hospital in the original operating theatres where the surgery occurred in December 1967.

The guided tour, specially arranged for delegates on a public holiday, raises ethical and religious issues regarding "moment of death", particularly contentious and hotly contested at the time as this was a world ‘first’. The beginning of the museum depicts a representation of the car accident in which the donor, Denise Darvall, was involved, The animal laboratory where Barnard conducted experiments on dogs to perfect the technique of heart transplantation is depicted. Re-creations of Denise Darvall's bedroom and Christiaan Barnard's office as well as the surgery in the actual operating theatres where it occurred can be seen, ending with Louis Washkansky's recovery room containing his hospital records that visitors can peruse.

The museum is in private hands but is treasured and well cared for and the guided tours offered by the museum are excellent.

The Adler Museum has a small but really wonderful collection of newspaper reports from the time which are displayed during the cardiology teaching module at Wits Medical School. Students page through these cuttings with real interest.

Perhaps not well known at all is the Nadin Parbhoo History of Anaesthesia Museum. Nadin Parbhoo was the Archivist of the South African Society of Anaesthesiologists (SASA) and the foremost anaesthetics historian in South Africa until his death in 2009. He published the history of the first 50 years of SASA in 1993. The book is entitled Five Decades – The History of the South African Society of Anaesthetists 1943 – 1993. He was awarded a Doctor of Medicine degree by UCT for his thesis on the History of the UCT Department of Anaesthesia from 1920 – 2000.

The UCT Anaesthesia Museum was started by Dr Jack Abelson and Dr CS "Buck" Jones in the 1950s. Professor Arthur Bull encouraged its growth during his tenure as Head of Department between 1961 and 1980. Dr Parbhoo was appointed honorary curator of the UCT Anaesthetic Department History of Anaesthesia Museum by Professor Harrison in 1980.
He had specialised in anaesthesia at UCT and obtained the FFA (SA) in 1983. He maintained links with that university and the department as a specialist and subsequently part-time senior lecturer until 1995. During his time as honorary curator he devoted a great deal of time to building up a specialist collection certainly unsurpassed in this country. Over the following years he visited every hospital theatre suite in the Cape Peninsula and solicited old equipment. He also advertised in relevant journals for equipment. With the opening of the New Groote Schuur Hospital in 1988, the original display was moved to the new department. With the enthusiastic blessing of Professor Mike James, Professor Nagin approached Crest Healthcare, Roche, Siemens, Boots Pharmaceuticals, Abbott Laboratories and Mr Brian Smith for assistance. They provided eight oak and glass showcases to house the collection which were installed on 28 October 1993. Since then, several more showcases have been added and the museum now houses over 500 historical examples which one can pore over for hours! The Department of Anaesthesia honoured him in March 2000 by naming this unique collection The Nagin Parbhoo Museum of Anaesthesia. In 2002 he was awarded the Degree of Doctor of Medicine by UCT for his thesis “The Department of Anaesthesia, UCT 1920-2000: A History”. Dr Parbhoo died in 2009. Emeritus Associate Professor Peter Gordon is presently the honorary curator of the museum and takes immense pride in its development.

As a measure of the esteem in which the museum is held internationally, at the conference the museum was presented with an exact replica of the ether inhaler used by Morton in his famous public display of the efficacy of ether anaesthesia to abolish the pain of surgery, in October 1846. The gift was donated by Dr George Bause, the Honorary Curator of the Wood Library Museum in the USA, in his private capacity, and presented on his behalf by Dr Wilkinson.

This article demonstrates how individuals with a sense of history can contribute to the development of museums. We only have to look at the Adler Museum of Medicine for a case in point. Developed and built up by Cyril Adler, a medical doctor and Wits alumnus, aided by his wife Esther, this museum was established through his interest in and commitment to the history of medicine in this country. Cyril’s vision was realized when Professor Max Price, then Dean of the Faculty of Health Sciences, saved the museum from certain closure when Wits University wanted to close it down in the late 1990s in a cost-saving drive. Professor Price, understanding the historical importance of and potential benefit of the museum for historical and teaching purposes, raised money through the National Lottery Trust Funds and relocated the museum from the then SAIMR to the foyer of Wits Medical School where it is proudly located today.

However, the story of Wit Medical School’s collection of anaesthetic history is somewhat disappointing. In discussion with Dr Silvio Breno who has been associated with the Wits Department of Anaesthetics since the early 1970s, my understanding is that a collection was built up over many years by various people but it always
remained a motley collection and was not added to systematically with a view to possibly establishing a permanent museum as was the case at UCT. It was used from time to time for teaching purposes but was not ever catalogued or 'curated' in a formal sense. It was housed in book cases in the departmental library and in cupboards in the department. Over the years, with changes in administration, the collection somehow got dispersed. Some of the items were donated to the Adler Museum but much of the collection was discarded and therefore lost to posterity.

As a museum curator, I am of course dismayed! My appeal is: please save the past! Please don’t throw away historical (old) things thinking they have no value. Take everything you think may be of interest to your nearest museum and let the curators decide!

Dear Rochelle Keene

Thank you for the magnificent publication Our graduates 1924 - 2012 you sent to me via Mrs S Masojada whose grandson (and my godson) is now enrolled to study medicine at Wits. The list of all the graduates brings back happy memories of my time at Wits and of course I’m proud to be a Witsie. Phillip Tobias was a year ahead of me but when I started practice in Durban I helped to look after his mother. I knew him very well as an undergraduate. I was also hospitalised as a student in Professor Elliott’s ward with jaundice and Tom Bothwell was the medical registrar. Robert Charlton and John Barlow were in our year and at Primary School in Rosebank I was in the same class as Cedric Bremner and Mickey Katzen and many others that I can remember so well and who have reached high academic heights. Mickey was a great raconteur and was always selected to give the introduction at congresses. He had a wonderful sense of humour and introduced the speeches of the invited guests in a lively manner, taking the “Mickey” out of them (excuse the pun).

Although I passed in 1951 with a first class pass in Surgery, for personal reasons I elected to go to Durban: a choice I have never regretted. I have been in active practice as a specialist surgeon at Entabeni Hospital in South Ridge Road for 53 years and although I no longer practice surgery as such I actively assist which keeps me up to date and it helps fill in the time of a long day that ensues after so-called retirement. By the way the land on which the hospital was built was originally owned by a mayor of Durban: George Cato. The name in Zulu means The Place on the Hill. The other graduate who passed with a first class pass in surgery was Cyril Toker who graduated in 1952.

As there were so many students due to the influx of ex-servicemen we were for our clinical years put into alphabetical groups. In our group was Felix Weingartz who had earned a DFC (Distinguished Flying Cross) in the South African Airforce during World War II and Des Whitaker who became medical officer to the Barlow Group with his own office in France. We remain great friends. He now lives in Southbroom and helped me shape my surgical career.

Yours sincerely

Roy O Wise
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Reference examples

Dr Frack had been a member of the 1919 Class, the Tin Templers.¹

It did not, however, include anything about osteology, for bones would have doubled the size of The Pocket Gray.²

Direct quotes should be in italics or in inverted commas

Military medicine, surgery, and nursing were matters too important to be left to private charity, however well intended…³

“The tenth edition of Aids to Anatomy appeared in 1940…. It had been edited by Professor Stibbe, who, sadly, in 1923 left the University of the Witwatersrand.”⁴

References


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30