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DAY 9:

A SYSTEM ... OF PROFOUND KNOWLEDGE

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(9.00am – 12.45pm; 1.45pm – 5.45pm)

Introduction (p 1); **A SYSTEM ...** (p 2); What ignited Japan? (p 3)

The "Old Way" and the "New Way" (p 3) — *contains Pauses for Thought 9-a and 9-b*

"A dynamic scientific process of acquiring knowledge" (p 5)

Activity 9-c (p 7 *[WB 142]*)

Organisation charts—vertical or horizontal? (p 7) — *contains Pause for Thought 9-d*

Where's the fault? (p 9); Some notes from friends (p 10)

Major Activity 9–e (p 11 *[WB 144]*); Stage 1 (p 12 *[WB 145]*)

— Stage 2 (p 12 *[WB 145]*)

— Stage 3 (p 13 *[WB 146]*)

— Stage 4 (p 14 *[WB 147]*)

— Stage 5 (p 15 *[WB 148]*)

... OF PROFOUND KNOWLEDGE; Our "12 Days"—what's left? (p 16)

Development of "Profound Knowledge"; Sources of learning (p 17);

Guidance for the Second Project (Days 10 and 11) (p 18)

Introductions to the System of Profound Knowledge (p 21)

"Out-of-hours" preparation for the Second Project (p 26)

"Out-of-hours" note; "Four Preludes and a Coda" *(part of file "Q. CONTRIBUTIONS ...)* (p 30)

DemDim pages 264–280 (p 30)

DAY 9: A SYSTEM ... OF PROFOUND KNOWLEDGE

Today's material is in two very distinct halves. As implied by the form of the above title, this morning's focus is on the concept of a "system". You are, of course, already quite familiar with this concept. But I would like to further develop your understanding of it, or indeed your *appreciation* of it—Dr Deming often used the phrase "appreciation for a system". When you first saw that on Day 1 page 39 it might have struck you as a rather odd choice of word—at least, that's what I thought when I first heard it. If that's still the case with you then I believe it will seem rather less odd to you by the end of this morning.

Today's complete title without the central break, i.e. "A System of Profound Knowledge", relates not only to this afternoon but also to the Second Project over the next two days. This afternoon firstly introduces you to what Dr Deming meant by that phrase and then moves on to preparing you for the Second Project in which you will take a very close look at some of what he wrote on it.

This morning's reading-matter is relatively short; but there is still plenty for you to do! In contrast, there is *only* reading for you this afternoon, although it is of some extremely varied styles. You will therefore have plenty of time for it, and it will be well worth that time. (I'm not being boastful: most of it wasn't written by me!)

Chapter 3 of *The New Economics* is "Introduction to a System". As already pointed out, that would not really be an "Introduction" as far as you are concerned. The treatment here, though, is very different from that in his Chapter 3. The latter is substantial and wide-ranging. As an example, his portrayal of the exercise in yesterday's Major Activity is contained within that chapter. By comparison, my treatment this morning is relatively brief. It does, however, add some useful background material that strengthens the foundations of both the theory and the practice of the system concept—some of which material again stretches back to (guess whom!) Dr Walter Shewhart.

I would describe what I have included in this morning's material as just sketching a background, rather like an artist's very broad brush-strokes at the earliest stages of creating a painting, with all the detail to be gradually filled in later. One reason for keeping this quite short is to allow you plenty of time for today's Major Activity which is to develop an "Organisation Viewed as a System" flow diagram for *your* organisation, guided by Deming's famous diagram that you saw as early as Day 1 page 35. You may recall that the diagram appeared there as the very first of his "Summary of Teachings to Top Management and to Engineers in Japan". This is really important. For after all, as we shall see, Dr Deming did describe that flow diagram as "the spark that turned Japan around". So, quite some spark! For your convenience it is reproduced on the next page.

You may fear that constructing a flow diagram for your organisation could be something of a tall order. You may think you do not know enough about your organisation to be able to complete such a diagram. If so, that might in itself tell you something about the organisation! However, in fact, the task may not be as daunting as you could be imagining. For Deming's system diagram is also "very broad brush". It involves only relatively *major* components of the system rather than details that you may well not know about. It is not a "flow *chart*" in the usual sense of that term since flow charts usually get into lots of "nitty-gritty" detail —that is *not* what is needed in Deming's diagram whose nature is instead very "macro". I shall re-emphasise this when the time comes. In any case, at this stage, getting a completely "right answer" is not what is important. It is the *learning* and understanding that are important. If not there currently, right answers will come later.

A SYSTEM ...

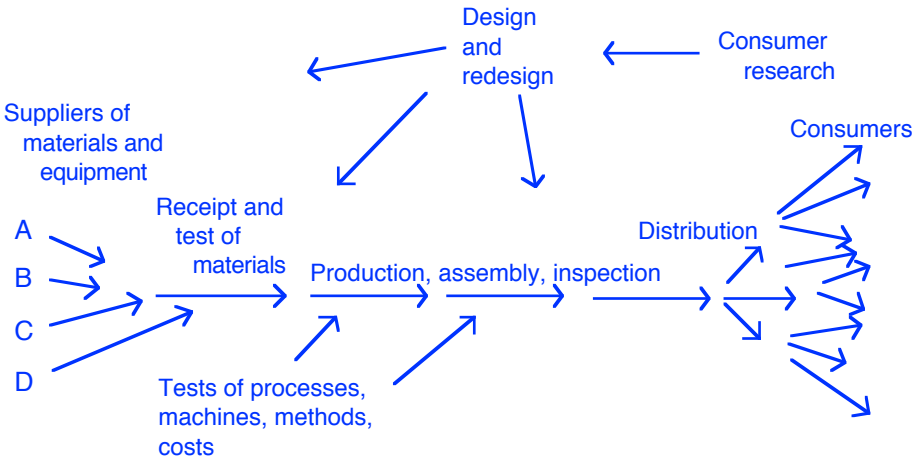
Learning about what Dr Deming meant by a "system" can be described as "double-value-for-money" learning, since this is crucial in two senses in the study and understanding of what he taught:

1. appreciating the *Deming philosophy* as a system, and
2. appreciating an *organisation* as a system.

The former has been an ever-present and developing theme throughout this course. The Activities during the Second Project which occupies all of Days 10 and 11 will also repeatedly return us to that theme. But during both this morning and tomorrow morning we shall concentrate more particularly on the second aspect. This morning provides some broad and fundamental thoughts about appreciating an *organisation* as a system, while tomorrow morning we shall get down to more detail.

Had I ever produced a new edition of *DemDim*, one change I'd surely have made would be to put the topic of "Appreciation for a System" much more "up-front". Except for the appropriate section in my System of Profound Knowledge chapter (Chapter 18), the most relevant writing is tucked away in Chapter 8: "Processes and Systems", which is in the middle of the already substantial Part 2 of the book.

Why did it finish up there there? Simply because at the time of writing *DemDim* (1989–90), although realising the topic was important, I had still not realised how *overwhelmingly* important it is. I should perhaps have been alerted by the position of the "Organisation Viewed as a System" flow diagram in *Out of the Crisis*—as early as page 3[4] in a book of over 400[500] pages. Furthermore, lacking sufficient powers of clairvoyance, I could not foresee that, two years later, I would discover it to be Number 1 in the "Summary of Teachings to Top Management and to Engineers in Japan" in Mrs Kilian's biography! But, despite these pointers, Dr Deming himself did not seem to place as much emphasis on it when I was first involved with him as he did later on. So maybe I have some excuse! As promised, here is the famous diagram again:



Note that, with his usual precise choice of words, Deming does not write "Customers" at the right-hand side of this diagram, but "Consumers". "Customer–Supplier Relationships" is an often-used phrase. However, the "customer" strictly refers to who *pays* for what is being bought rather than necessarily who *uses* it. Clearly it is the experience of, and information from, the *consumer* that is needed to aid the improvement implicit in the use of the flow diagram.

What ignited Japan?

But there was certainly no doubt about the importance of the flow diagram in Deming's teaching later on. I'll refer here to a meeting held at the Queen Elizabeth Conference Centre, London in July 1990 that was jointly arranged by the European Federation for Quality Management and the British Deming Association. It was attended by top management representatives of around 20 "big-name" European companies. To those senior executives, Dr Deming simply said of the "Organisation Viewed as a System" flow diagram:

> "I believe that this diagram made the difference in Japan."[a]

Quite a claim for a single and not particularly complicated sketch! Did he really mean it—that just that diagram (and, obviously, the learning which it portrays) had made *the* difference in Japan?

Yes, he did. If you read *The New Economics* page 41[57] then you'll be left in no doubt. There you will find a section headed with the question: "What ignited Japan?". The section begins as follows—and this not only *makes* the claim but also explains *why* he made it:

> "The flow diagram … was the spark that in 1950 and onward turned Japan around. It displayed to top management and to engineers a system of production. The Japanese had knowledge, great knowledge, but it was in bits and pieces, uncoordinated. This flow diagram directed their knowledge and efforts into a system of production, geared to the market—namely, prediction of needs of customers. The whole world knows about the results.
>
> This simple flow diagram was on the blackboard at every conference with top management in 1950 and onward. It was on the blackboard in the teaching of engineers.
>
> Action began to take place when top management and engineers saw how to use their knowledge."

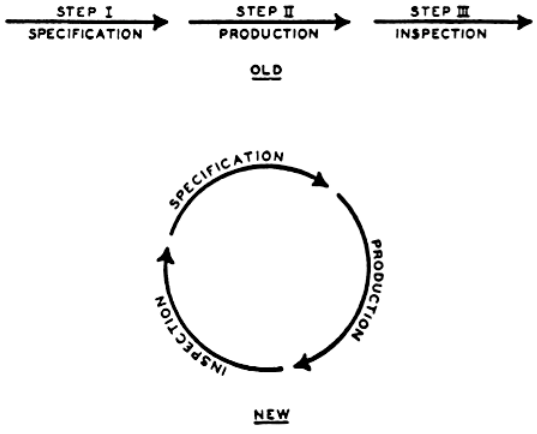
That extract is versed in the context of production. Indeed, Dr Deming's own title for the flow diagram on *Out of the Crisis* page 3[4] was "Production Viewed as a System". I prefer the more generic "*Organisation* Viewed as a System", for the concept is surely universal. In fact, within the small print under the diagram in *Out of the Crisis*, Dr Deming indicated such a universal nature by remarking how the diagram can easily be amended to apply to a service organisation by just changing a few words. That small-print description is well worth reproducing in full:

> "**Figure 1.** Production viewed as a system. Improvement of quality envelops the entire production line, from incoming materials to the consumer, and redesign of product and service for the future. This chart was first used in August 1950 at a conference with top management at the Hotel de Yama on Mount Hakone in Japan. In a service organisation, the sources A, B, C, etc, could be sources of data, or work from preceding operations, such as charges (as in a department store), calculation of charges, deposits, withdrawals, inventories in and out, transcriptions, shipping orders, and the like."

The "Old Way" and the "New Way"

As we know, Dr Deming attributed to Walter Shewhart the origin of much of his thinking—i.e. considerably more than just the statistical content.

And who could doubt that that was true of his thoughts on "Production (or The Organisation) Viewed as a System" after seeing the diagram alongside? This is reproduced from page 45 of Shewhart's 1939 book: *Statistical Method from the Viewpoint of Quality Control*.

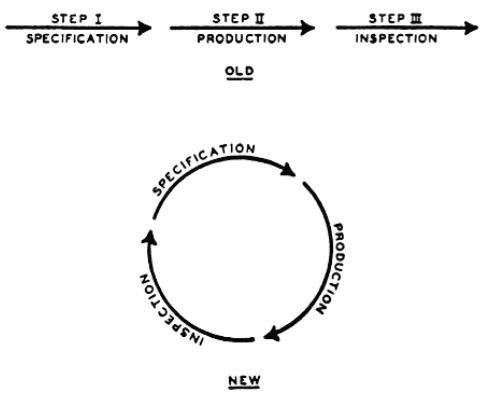


Were there a prize for the best-ever combination of simple and profound, this would be strong competition for the Experiment on Red Beads! Again, Shewhart was primarily concerned here with manufacturing applications, which explains his choice of the particular three words used in the two parts of the diagram. But that's not what is most important.

The following two Pauses for Thought (pages 4–5) are also on Workbook pages 141–142.

PAUSE FOR THOUGHT 9–a

So what *is* the important difference between the "Old Way" and the "New Way"?



It's simply the difference between a line and a circle! The line stops (or disappears). But the circle keeps going round.

PAUSE FOR THOUGHT 9–b

What kind of things does that simple change from a line to a circle signify to you?

The "Old Way"

You do *this* (Step 1), then you do *that* (Step 2), then you do *something else* (Step 3)—and that's it! Done; finished; gone. And later, presumably you may do something similar again, one or more times. And each time it's simply: done; finished; *gone!*

The "New Way"

The circle immediately creates thoughts of feedback, learning, improvement. Having gone around the circle once, *Step 3 leads back into Step 1*. We *learn* from what happened the first time around and, as a result, we may appropriately alter (improve) Step 1, according to what has just been learned. And that in turn is likely to alter (improve) what happens in Step 2, which is likely to alter (improve) what happens in Step 3. And the learning from that second cycle is fed into the third cycle, improving what happens throughout yet further.

Very simple, yes—but *profoundly* important.

Sadly, despite it now being more than three-quarters of a century since Shewhart wrote his book, the fact is that, as regards so much of what goes on in many organisations, there are still many more lines than circles—many more "Old Way"s than "New Way"s.

"A dynamic scientific process of acquiring knowledge"

As Dr Deming pointed out, Walter Shewhart's own language is often not easy to understand. In addition, in his 1939 book, Shewhart was concerned with expressing things in statistical terms, as implied by its title which, recall, was: *Statistical Method from the Viewpoint of Quality Control*.

But I'd like to quote a couple of extracts from his discussion on the "Old" and the "New" Ways whose message soon becomes crystal-clear. On page 44 of his 1939 book he expresses these thoughts in terms of two types of "science":

> "On the older concept of an exact science these three steps ... would be independent. One could specify what he wanted, someone else could take this specification as a guide and make the thing, and an inspector or quality judge could measure the thing to see if it met specifications. A beautifully simple picture!"

But he then goes on to point out that …

> "The whole picture, however, is radically different just as soon as we admit that we only have a probable science."

By an "exact" science he implies there is neither variation nor interdependence involved. But with a "probable" science there is variation to contend with along with interdependence between the steps. In particular, variation in one step is caused by variation in previous steps and causes variation in future steps. Thus Shewhart argues that

> "In fact these three steps must go in a circle instead of in a straight line."

And having done that, with the resulting change in thought and action, he now observes …

> "The three steps constitute a dynamic scientific process of acquiring knowledge."

A dynamic scientific process of acquiring knowledge! Rather different from *done; finished; gone!* And this was back in 1939—hardly "rocket science"! But eminently profound. No wonder Dr Deming always spoke of Walter Shewhart with such warmth and gratitude.

After referencing Shewhart's work just described, on *Out of the Crisis* pages 154–155[180–181] Dr Deming then goes on in his Figure 9 to reproduce the same concepts with some different words: simpler ones for the "Old Way" and a crucial expansion of the "New Way":

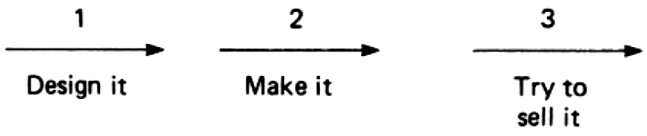


Fig. 9a. The old way.

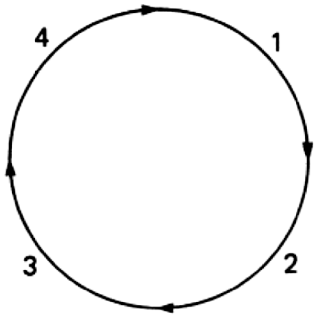


Fig. 9b. The new way. Introduce a fourth step: test the product in service.

He follows this with:

> "Continuation of the four steps leads to a helix of continual improvement of satisfaction of the consumer, at a lower and lower cost"

and then illustrates such a helix in his Figure 10:

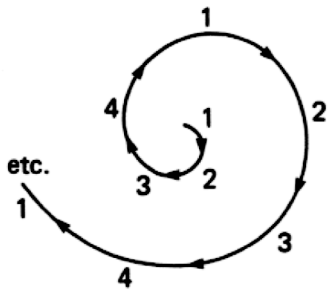


Fig. 10. The helix. Continue the cycle, over and over, with never-ending improvement of quality, at lower and lower cost.

What better and simpler way could there be of depicting the cumulative and multiplying effects of genuine improvements and the resulting increases in knowledge, understanding and ability? And even this has its origins in Shewhart (1939, page 45) where, still talking of the three steps, he wrote:

> "From this viewpoint, it might be better to show them as forming a sort of spiral."

For further emphasis, Deming then reiterates the point just made (*Out of the Crisis* page 154[181]):

> "Through improvement of quality, guided by consumer research, the ultimate result is not only better quality but also lower cost and improvement of competitive position."

And where do we find ourselves? Surely we are back yet again at the Deming Chain Reaction (*DemDim* page 33). Further, that development of the "helix" leads directly to what Deming (unlike others) always called the "Shewhart Cycle" which we shall study on Day 11.

Activity 9–c is also on Workbook page 142.

ACTIVITY 9–c

With regard to your organisation, suggest some ways in which the improvement of quality would *reduce* cost.

(If you need a hint, you will find one on Appendix page 38.)

Organisation charts—vertical or horizontal?

With recent thoughts in mind, the development of the flow diagram which "ignited Japan" need not be difficult. Deming didn't *say* it was difficult. He just said it was "the spark that turned Japan around"!

His description of the flow diagram when talking with Dr Russell Ackoff in Volume 21 of *The Deming Library* is also instructive:

> "It all goes back to understanding a system. And that is the way I taught the Japanese top management in 1950. The aim of the system. Draw a flow diagram: what happens? what happens next? And, in that flow diagram, anybody may see what his job is. A flow diagram is an organisation chart. Anybody that works there ... can see what his job is."

An organisation chart! How the organisation *should* be organised! As opposed to what? Well, I think you may agree that there is some rather neat implicit teaching in Dr Deming's innocent (?) use of that term "organisation chart"—for we know what that expression means to most people. **See Figure 24 (*DemDim* page 133** *[directly under Deming's flow diagram for immediate comparison!]***), along with the superb cartoon version in Figure 25 on the following page. Having turned to those pages, please read the short passage which begins just under Figure 25 and continues to midway through the following page.** Deming's "organisation chart" is *perpendicular* to the conventional one! The conventional one is *vertical*; Deming's is *horizontal*.

So what? One way of answering that question is to relate something further that I learned from Peter Scholtes; and (not by coincidence, I suggest) this is "up-front" in his excellent book: *The Leader's Handbook*. The *conventional* organisation chart (*DemDim* Figure 24) is the very first diagram in Peter's book (Figure 1–1 on his page 3). But he's given it an interesting name: "The 'train-wreck' chart". Indeed, the initial section of his book is titled "Train-Wreck Management".

According to Peter (and, to the best of my knowledge, nobody ever contradicted him), the story is as follows. In October 1841, two Western Railroad passenger trains collided head-on somewhere between Worcester, Massachusetts and Albany, New York, killing a conductor and a passenger and injuring 17 more. The Massachusetts legislature launched an investigation into the crash and appointed a committee to suggest how such an accident might be prevented in the future. One of their recommendations was to construct what we now know as a "conventional organisation chart". Why? Let me quote Peter:

> "A fundamental premise of the 'train-wreck' approach to management is that the primary cause of problems is 'dereliction of duty'. The purpose of the organisation chart is to sufficiently specify those duties so that management can quickly assign blame, should another accident occur."

Does that sound familiar to you? The conventional organisation chart helps you to speedily find out whom to blame! If something goes wrong, it must be *somebody's fault*. The fundamental error in this is already familiar to us, e.g. from the Red Beads Experiment and from our discussions on common and special causes. Quoting just one more sentence from *The Leader's Handbook*:

> "While the standard organisation chart may seem ageless, it was, in fact, adapted from the Prussian Army and introduced to American business practice as a way to prevent train wrecks!"

Peter's second section is headed: "Meanwhile, in Japan ... ", and before long, in contrast, we see Dr Deming's (horizontal) flow diagram.

If you would like to study more on this, I strongly recommend Chapter 1 of *The Leader's Handbook*.

Pause for Thought 9–d (pages 8–9) is also on Workbook page 143.

PAUSE FOR THOUGHT 9–d

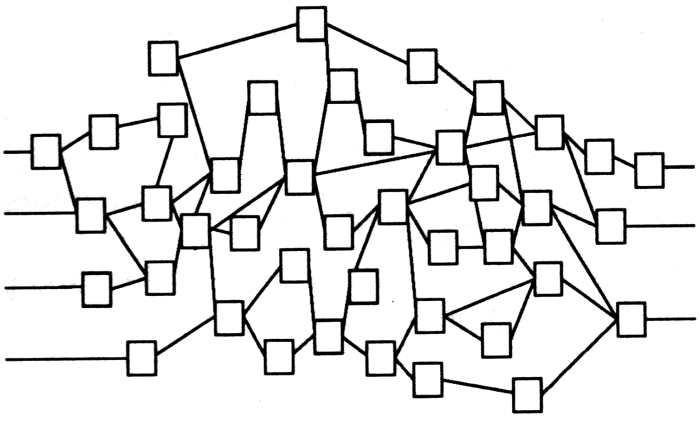
How would you describe the relationship between Shewhart's diagram of the "New Way" (refer back to the diagram on page 3 and also to your thoughts on page 4) with Deming's "Production (or Organisation) Viewed as a System" flow diagram on page 2? And what might that tell you about the *purpose* of Deming's flow diagram?

Surely the "New Way" diagram is an embryonic version of Deming's flow diagram—and in fact, with Shewhart's particular choice of words, of Deming's original "*Production* Viewed as a System" flow diagram. So what does that tell us about the *purpose* of the flow diagram? We have already seen that the "New Way" diagram immediately relates to *improvement*. So is that not the essential purpose of Deming's flow diagram itself? Remember his description of what the flow diagram does and what the consequence is: "A flow diagram is an organisation chart. Anybody that works there ... can see what his job is." By contrast, what does the conventional organisation chart do, and what does it show? It shows the "chain of command". Rather than helping people to see what their *job* is, it tells them who their *boss* is (they probably knew already!). But, of course, sadly the truth is that, in organisations where the conventional organisation chart is the more appropriate picture, this *does* show people what their job is there: it is to please the boss. If Deming's "organisation chart" is the more appropriate, their job is instead to please their consumer(s), be they internal or external.

Where's the fault?

A message coming loud and clear is therefore the need to start constructing (horizontal) flow diagrams—and to use them. This is, as mentioned on today's opening page, what you'll soon be doing in today's Major Activity. An even more "macro" flow diagram (i.e. with larger components) is illustrated in Volume 21 of *The Deming Library* (also mentioned earlier today): a flow diagram for an education system; and that illustration is indeed very similar in structure to Deming's "Organisation Viewed as a System" diagram.

Having established a "macro" flow diagram for the organisation (or whatever system is being studied), it may then be useful to develop other diagrams and charts which have a little more detail both in regard to the parts of the organisation included and their main interconnections. **Take a look at the example from Joiner Associates on *DemDim* page 124.** However, do *not* go overboard with this, especially for the time being. It is important that Deming flow diagrams be *comprehensible in their entirety*, unlike ultra-detailed flow *charts* that can cover whole walls. The diagram that follows (from Bill Scherkenbach's *Deming's Road to Continual Improvement*[b] page 10) is conceptual, rather than being intended as a model!



While addressing the British Deming Association's 1991 Annual Conference, Bill showed this picture with a comment to the effect that "this is what any organisation is". There are lots and lots of boxes (representing groups, departments, individuals, etc)—and also lots and lots of lines joining the boxes to indicate the numerous interconnections between them.

So what is to be gained by constructing Deming's flow diagram? The important answer is that it helps us to change the way we *think*; and, as we have so often remarked before, what we *think* greatly affects what we *do*. It can therefore help management to start doing things differently. Such as what?

Consider the Massachusetts train wreck again. Was it really just somebody's fault? With the advantage of our (Deming's) thinking, we would surely doubt it. Was it not far more likely to have been a problem, a serious failing, of the *system* within which the people (at all levels) in the Railroad were working? In fact, if an individual's error could have caused such havoc, surely an implication is that this was a poor system in dire

need of improvement anyway. (I am reminded of the Zeebruge *Herald of Free Enterprise* ferry disaster in 1987, apparently the result of the assistant boatswain being asleep when he should have been closing the bow-door.)

Again, as demonstrated by the Red Beads Experiment, people are at the mercy of the system. It is the *system* that needs improvement, in order that people are *allowed*, *helped* and *encouraged* to do good work. So now, when something goes wrong, the attention is not on finding a scapegoat but on examining what it was in preceding stages of the system (as indicated in the flow diagram) which *caused* it to go wrong. Then there is at least some chance of improving the system so that that "something" doesn't go wrong again—a chance that didn't even exist previously.

More generally, if things do not seem to be working well in some part of an organisation, what is it that "feeds in" to that part of the organisation that might be causing the trouble? If salespeople can't sell, maybe it's because the product isn't very sellable. If the product isn't very sellable, perhaps there were weaknesses at the design stage. Perhaps the reliability of the product is less than what the market would like—maybe at least partly caused by Purchasing awarding business on lowest price. Why should Purchasing be doing that? Perhaps in order to keep to a budget, or to achieve some target reduction in material costs. And where does that budget or target come from? From higher up in the *conventional* organisation chart! Blaming salespeople for poor sales, or "incentivising" them by higher commissions or fear of dismissal is rather a long way from the source of the real problem—which is that the organisation is *not* being viewed as a system. As we know, Dr Deming had a word for it: *suboptimisation*. (C.f. Gallery Furniture, in particular Mack's "Then and Now" section on Day 6 page 13.)

Some notes from friends

Dave Young showed me a couple of excellent comparisons between the two types of organisation chart that friends had suggested to him. First: "The traditional organisation chart is a pyramid; it points upward, to the boss, to the shareholder. Deming's chart points horizontally, to the consumer, to the customer." And second: "The traditional organisation chart tells us a lot about who reports to whom, but absolutely nothing about what the organisation actually does."

Also, Alan Hodges pointed out to me that Deming's helix diagram (see page 6) has been adopted in the international standards ISO 14001 (Environment) and ISO 18001 (Management of Health and Safety).

When I first heard Deming's term "flow diagram", I did realise that he wasn't saying what I was familiar with, i.e. "flow *chart*", but I didn't realise the importance of the difference straightaway. "John" (of Day 7 fame!) wrote to me at some length about this: here is part of what he said:

"The beauty of Deming's system diagram is that it combines the purpose of the organisation with the key activities which the organisation undertakes. People can see the end point plus where their work fits within the processes and whom they affect and by whom they are affected. The key point for me is simplicity, which is frequently missed by the box-tickers of this world. Unfortunately there is a myriad of different types of 'flow charts' (key process maps, SIPOC, process mapping, swim lanes, VSM etc) which tend to draw thinking to minutiae, thus missing the whole point of Deming's diagram. The purpose of the organisation or process becomes lost in the detail—and people lose their way in the system rather than concentrating on achieving its purpose.

I visited a designer who had 'every part of the system' available in an electronic flow-charted form. Nobody working on our project was even aware of its existence. Worse still, they decided that it did not apply to the design work they did during our tendering period! Also, a large construction company were proud to tell me about a flow chart that they had put together for everything in their management system. It covered five sheets of A0 paper. But was it useful? Did anyone ever look at it?"

Major Activity 9–e (pages 11–15) is also on Workbook pages 144–148.

MAJOR ACTIVITY 9–e

With what you have learned this morning fresh in mind, it is now time for you to try to develop a "macro" flow diagram of your organisation. To prepare the ground for that, I will quote in advance an extract in Dr Deming's own words from Day 10:

> "A system of schools (public schools, private schools, parochial schools, trade schools, for example) is not merely pupils, teachers, school boards, and parents. It should be, instead, a component in a system of education in which pupils from toddlers on up take joy in learning, free from fear of grades and gold stars, and in which teachers take joy in their work, free from fear of ranking. It would be a system that recognises *[and appreciates]* differences between pupils and differences between teachers. The reader, after study of the rest of this paper, might wish to try to construct a system of medical care."[c]

The reason for Dr Deming beginning this extract by discussing a "system of schools" is that a "system of medical care" is of a similar order of magnitude—i.e. countrywide or larger! Thus the components to be included in the diagram will also generally be large. Notice further that his system of schools is clearly a *good* system.

By "this paper" Deming was referring to the May 1990 version of the System of Profound Knowledge whose full text is reproduced between the final pages of today's material and the end of Day 11. That full text is also contained in *A System of Profound Knowledge*, BDA Booklet A9 pages 3–20 (see the information at [c] on page 31).

The procedure in this Major Activity is divided into five stages. The first stage gives you some initial practice at constructing a flow diagram by attempting to follow Dr Deming's suggestion above. Clearly, some of the detail in any such attempt will depend on local circumstances, such as the country in which you are living, and maybe which region of the country. The fine detail does not matter: but the concept does.

Stage 1. Therefore first spend a little time beginning to try to construct a system of medical care in the space below, of similar layout to Dr Deming's famous flow diagram and repeatedly referring back to it on page 2 or *DemDim* page 133. But remember to keep it "macro": do not try to make it detailed or complicated—be guided by the nature of what is in his diagram. Also, don't expect to complete this task right now, as there is some help for you in the Appendix. However, as usual, do what you can first *before* turning to the Appendix, for that is Stage 2 below. Then at Stage 3 I shall give you some suggestions about how to tackle the flow diagram of your organisation. You might like to look ahead at those thoughts in Stage 3 right now (on the next page) and then also use them to help you with this initial practice diagram.

Stage 2. Now study my attempt on Appendix page 38. That may give you some further ideas as to what you might include in your attempt at Stage 1. So then spend a little more time revising your Stage 1 diagram.

Stage 3. And now try to apply what you have learned during the first two stages to develop an "Organisation Viewed as a System" flow diagram of your own organisation.

It would probably be sensible to start with the central track, broadly summarising the main aspects of what the organisation does. In Deming's diagram the central track starts at "Receipt and test of materials", then proceeds through production, assembly and inspection, and goes as far as "Distribution". A useful way to then proceed with the rest of the diagram is to ask yourself lots of questions. What comes into the system? Where does it come from? What important contributions enter the central track "from the side" (like the "Tests of processes, machines, methods, costs" in Deming's diagram)? What goes out of our system? To where, to whom? That is, who and where are our "consumers"? How do we get to learn what our consumers think about what they get from us? What do we do with that information? How do we use it to help improve the system?

Stage 4. Next, considering your flow diagram constructed at Stage 3, describe examples of how what happens in one part of the flow diagram is being hindered by some things happening (or not happening) elsewhere in the flow diagram. Does consideration of the *conventional* organisation chart explain why those harmful things are happening? What could be done to *help* rather than *hinder*?

Stage 5. Finally construct a modified version of your Stage 3 diagram, bearing in mind your answers at Stage 4, thus showing how your organisation could become a *better* system than it is now.

... OF PROFOUND KNOWLEDGE

Our "12 Days"—what's left?

The structure of this course is largely chronological, beginning with Shewhart's understanding of variation and then concentrating on Dr Deming's teaching during the 1980s. Now we reach the 1990s, his final four years. I began today by pointing out that Chapter 3 of *The New Economics* is "Introduction to a System", obviously directly related to this morning's work. The fourth chapter in *The New Economics* is titled "A System of Profound Knowledge". Not only is that chapter directly related to this afternoon's material, it is also directly related to the next two days' work which will mostly involve studying Deming's exact words.

On Day 1 page 39 I described Deming's System of Profound Knowledge as "his attempt, sometimes with the wisdom of hindsight, to summarise the core, the guts, the essence of his whole life's work". But that doesn't mean we should forget about his earlier teaching! I know some people who became so excited about the System of Profound Knowledge that they almost seemed to regard the 14 Points etc as "kid's stuff"! Oh no. We shall be revisiting those two famous lists of guidance from the 1980s: the 14 Points (for adoption) and the Deadly Diseases (for cure), which we studied with respect to the Joiner Triangle in the First Project on Days 4 and 5. But now, of course, we shall instead study them directly with respect to the System of Profound Knowledge itself. Recall from Day 6 page 6 that, having described the System of Profound Knowledge as "the outside view" (*The New Economics* page 64 [93]), Dr Deming then simply stated:

> "The 14 Points for management ... in industry, education, and government follow naturally as application of this outside knowledge, for transformation from the present style of Western management to one of optimisation."

Apart from a similar statement in the Preface and a brief reference to Point 1 on page 36 [51], this is in fact his only mention of the 14 Points in the whole book! So Dr Deming was clearly now leaving it to us to figure out how and why the 14 Points *follow naturally* from the System of Profound Knowledge—not *forget* about them! The purpose of his teaching, after all, was not to simply give us answers but, more importantly, to get us to *think* and to *understand*, which will then better enable us to deal with the "nitty-gritty" of his earlier work. And that is what we shall endeavour to do here in the Second Project on Days 10 and 11.

Deming's Chapter 4 has an obvious five-part structure: firstly an introduction to the System of Profound Knowledge, followed by its four parts:

A. Appreciation for a system;
B. Some knowledge of theory of variation (sometimes he called it "statistical theory");
C. Theory of knowledge;
D. Knowledge of psychology.

The five half-days from here through to the end of Day 11 follow the same five-part structure, though I have adjusted the balance quite a lot.

Finally, on Day 12, we shall do a number of things to finally "bring it all together"—at least as far as we can within the context of a course such as this. There was one fallacy in my analogy near the beginning of the course about Dr Deming's theory of management being like a large jigsaw. The difference about *this* jigsaw is that, the more you work at it so that the more pieces you fit together, the more pieces seem to keep materialising—ones that you hadn't seen before! So there will be yet further contributions to your lifelong learning! And remember what (good) theory is for: the more good theory you have and the better you understand it, the more help you will have for guiding you and your organisation toward better practice—which was the purpose of Dr Deming's teaching, and my own purpose in developing this course.

Development of "Profound Knowledge"

It will be helpful at this point for you to **read through a short section in *DemDim*: page 259 to two-thirds down page 261.** This will give you some general background and a brief history of the development of Dr Deming's work on "Profound Knowledge" during those final years of his life.

> You may notice that the titles of the four parts of the System of Profound Knowledge as presented on *DemDim* page 261 are slightly different from those that you have just seen here. That is not unusual—Dr Deming himself did not always stick exactly to the same words. The same is true of other authors. For example, you already saw other slight variations in the titles long ago in Peter Scholtes's diagrammatic representation on Day 1 page 39. Take a quick look at it again if you've forgotten it.

Sources of learning

Such is the nature of the System of Profound Knowledge that it is valuable to have more than one source of reference in order to obtain a better-rounded appreciation of its content. The material that follows here through to the end of Day 11 is based on Deming's May 1990 version referred to on *DemDim* page 260.

I have always liked the May 1990 version which is reproduced in its entirety within the material between today's page 24 and the end of Day 11 (the relevant material on Days 10 and 11 also being in the Workbook), unchanged apart from occasional rewording and reordering. Part C on the Theory of Knowledge is the shortest of the four parts and so, during the morning of Day 11, I shall include extra material on two important topics of direct relevance to that part: operational definitions and the Shewhart Cycle.

One attraction to me of this 1990 version is its *compactness*. Issue after issue that Dr Deming raises is stated with extraordinary economy of words—something at which he excelled. But such compactness rarely makes it *easy* to read. Making it easy wasn't his purpose! His intention was instead to provide focus for thought and study in a much more effective way than ordinary text can do. Indeed, Parts B and C and some of Part D are written as lists, with most items on the lists containing no more than two sentences!

Coincidentally, *DemDim* was first published at about the same time as the May 1990 version of the System of Profound Knowledge. However, as you will have just read on *DemDim* page 260, my Chapter 18 was "revised" two years later—in fact, it was almost completely rewritten! And so your second source of learning is that chapter in *DemDim*: it should become your constant companion throughout the next two Days.

The third, and of course ultimately the most important, source must naturally be Dr Deming's final book: *The New Economics for Industry, Government, Education*. I have already pointed out that our material here for Days 9–11 is guided by the pattern of his Chapters 3 and 4. But note that several of the topics to be covered both here and in *DemDim* Chapter 18 are discussed elsewhere in *The New Economics* rather than solely within those two chapters.

With these three sources you therefore have (1) the opportunity to study the System of Profound Knowledge as it was in the relatively early days, May 1990, of its development; then (2) as it was halfway through its time of development in *DemDim*'s rewritten Chapter 18; and then (3) through Dr Deming's final writings in *The New Economics*. Although *The New Economics* is considerably shorter than *Out of the Crisis*, you will not be able to get very deeply into it within the context of this course without a considerably greater commitment of time—so I'm not expecting you to do so. However, looking ahead, I *would* suggest that *The New Economics* should be top of your reading-list immediately after you have completed this course in order to consolidate your learning. But don't be tempted to try to make enormous use of it during the Second Project (especially in view of the final sentence of the previous paragraph) or, again, you're unlikely to be able to work through the project in anything like my recommended length of time.

Guidance for the Second Project (Days 10 and 11)

So—how to approach the System of Profound Knowledge? Not an easy question when faced with the start of some lifelong learning! But I hope you will find the following guidance to be useful advice on how to proceed fruitfully with the Second Project, your initial attempt to learn something substantial about it. There's a *lot* of detail here, but there's a one-page summary of my suggested procedure on page 29.

I shall ask you to thoroughly familiarise yourself with the following guidance *before* starting Day 10. I'm introducing these thoughts to you now to enable you to carefully consider in advance the issues involved.

It has probably occurred to you already that, with our big build-up to the System of Profound Knowledge—along with its very name and the description of it as "Deming's legacy", etc—two days may not be enough time to learn all about it. If so, you'd be right!

So let's be clear about the purpose of this two-day project. In one sense it is ambitious, but not ridiculously so. In another sense it's quite limited: the purpose is definitely not "to learn *all* about it"! The role of this project with respect to the whole System of Profound Knowledge mirrors the role of the Overture on Day 1 with respect to this course as a whole. So let me recall a few words from the opening page of Day 1. Relating an Overture to a musical production I said: "It sets the scene by including several of the main themes from the show, and gives some tasters of the moods and style of what is to follow." With a few changes of words, we could now say something like: "The Second Project sets the scene by including several of the main themes from the System of Profound Knowledge and gives you some tasters of its mood and style". The Overture provided you with a good "feel" about what was in the show—but it was no replacement for the show itself. This project is similarly no replacement for comprehensive and deep learning on "Deming's legacy"—that will take much more than two days (dare I mention "lifelong learning" yet again?). What you learn in this course is just a start—a *good* start, I trust, but just a start nonetheless.

Presumably, long ago when you read our Overture, you found some things that you could immediately understand. On the other hand, some of what I said there may have seemed almost incomprehensible at the time—hopefully, less so by now! I imagine the majority of the content lay somewhere between those two extremes. The same will be true here concerning the System of Profound Knowledge. There is a lot to cover in two days, so be warned that you won't have a lot of time to figure things out. If you were to take the time to try to get on top of everything which will be introduced here then two days would soon expand into two weeks or two months or probably much more!

In a way, the limitation to two days is actually an advantage. You will *know* from the start that it will be impractical for you to spend ages thinking about individual items. Why is that an advantage? Because, at this early stage, dwelling lengthily on particular matters would result in your study of the four parts of the System of Profound Knowledge being *far too spread out*—and the serious consequence of that is the danger that you would largely miss the way that the four parts *are interdependent and compliment each other*. When you reach Dr Deming's introduction a little later this afternoon you will find that his opening sentence is: "The System of Profound Knowledge appears here in four parts, *all related to each other*" (my italics). What's vital is for you to get a good sense of that *interlinking* nature even if plenty of the detail of what's in the four parts may remain rather hazy for the time being. So the aim of this project is for you to acquire a "big-picture" view. Filling in the details will come in time—but then at least you will understand what you are filling them into! These two days will be just your initial scratch of the surface. As time goes on you will dig through that surface in order to expose the hidden depths that lie beneath.

I'll divide the work you'll carry out on each part of the System of Profound Knowledge into four steps that I will describe over the next two and a half pages and are summarised on page 29 *[also on WB 151]*. These four steps will be broadly followed in each case, but will be slightly modified when desirable.

Step 1: Browsing session

There are various possibilities about how to tackle each part of the System of Profound Knowledge respectively over the four half-days. I'll describe some of them to you, to help you decide what is most appealing to you. There is no "best" choice. As Deming observed in the "Knowledge of Psychology" section (see e.g. *DemDim* page 278), "People learn in different ways", and that's why it needs to be largely your personal choice. So please be patient as you consider the various options: your choice is important. You could, for example, make an immediate start on considering in turn and in detail each of the individual issues that Dr Deming raises, following his text as reproduced during Days 10 and 11. Or, before that, you might prefer to get an advance taste of what is to come by reading through all of the text for that half-day up to the beginning of the relevant Activity. Also, if you're in "advance browsing" mood, you might like to read through the relevant section of *DemDim* Chapter 18—not particularly slowly or carefully initially but just to help set the scene. I *shall* ask you at Step 3 to study those pages from *DemDim* (even if you have already browsed through them earlier) *after* working through all the individual issues: you will get more out of that section in Chapter 18 at that stage. For your reference, both here within the course and in the future, I shall include the relevant page numbers from both *DemDim* and *The New Economics* within each part during the Second Project. But remember that, even if you already have a copy, I'm not expecting you to make a great amount of use of *The New Economics* during this project—there won't be time for that.

There is one piece of advance reading that I shall definitely recommend for you near the start of each half-day. Later this afternoon I'll ask you to read some relatively gentle introductory material on the System of Profound Knowledge—certainly gentler than Dr Deming's own writing! I will tell you about this on page 23. So, to help set the scene, I definitely suggest you should re-read the relevant part of that material before starting on the main business of each half-day. To accommodate this and other advance reading suggested above, my timing guidance will usually include a half-hour for browsing before you get down to the main work. Depending on how much you decide to do, you may not need the whole half-hour. In that case, make an early start on the "real work" so that, for a little while at least, you'll be ahead of the clock!

Step 2: Dr Deming's May 1990 version

Now comes the most substantial section of each half-day in which you will work through the relevant part of the 1990 version of the System of Profound Knowledge, item by item. Following what I said a little earlier, you know that Dr Deming's descriptions of the various items in this version are extremely succinct. You have had a taste of that style several times already during the course. You are also aware that, during the project, you'll have fairly limited time to spend on each issue.

Again there's a variety of possibilities for how to proceed. As in Step 1, I'll run through some of them here so that, as before, you'll be able to get a sense of what appeals to you and what doesn't. Also, if you can think of yet further possibilities for what would help your learning—fine, try them out.

One obvious possibility of how to start—and this will certainly be quick and easy—is for you to describe your immediate reaction(s) upon reading an item. There is a space after each item in which to write your comments, questions, thoughts. Remember that, in many cases, there won't be much to read—maybe just one short sentence! Examples of such immediate reactions might be: "Really important" or "I'm already familiar with this" or "My organisation is doing the direct opposite to this!". Other immediate reactions might be in the form of questions such as "Why is he saying this?" or "What does he mean by that?" or "What does this imply?". In fact, immediate reactions in the form of questions would be very useful since you could then spend the available time by trying to answer them! Some initial reactions which are not originally in the form of questions could also soon *lead* to questions, like "*Why* is my organisation doing the direct opposite to this?" or "What would be the benefits if my organisation *stopped* doing the direct opposite to this?".

If your initial reaction was something like the first two suggested above, "Really important" or "I'm already familiar with this", what then? You could, of course, move straight on to the next item. However, I have a suggestion for such cases, a suggestion that will in fact be extremely useful preparation for when you reach the final Major Activity of the course at the end of Day 12. Imagine that you are with a friend who has not been working on this course but has been quite interested in the little that you have so far told him about it. (It would be particularly useful to choose a friend who is also part of "your organisation" so that references to what happens there, or doesn't happen, would be helpful.) Your friend has, of course, not previously been exposed to Deming's style of writing. First, and if necessary, see if you can translate the item into a form which your friend *can* understand! Naturally, you will almost certainly need to include a larger amount of description, and you will have to use words in ways with which you and your friend are *both* familiar. There is, of course, no reason why you shouldn't refer directly to what Deming wrote as well: there's no harm in introducing your friend to that style of writing as you explain things to him—he might get interested in reading some of Deming's work himself before long, and you'll have helped get him off to a great start! Following the translation (if needed), explain to your friend why Deming is including this item and what's important about it. Basically I'm suggesting that, for those items in Deming's writing that you are already fairly happy about, you have a little practice here for preparing to teach somebody else about it. It has often been said that the best way to really understand something is to teach it to others! I can personally heartily endorse that statement.

Other suggestions for what you might include are any illustrations from your own experience relevant to what Dr Deming is talking about, and also any important connections you see with earlier material in this course. Remember that here I am deliberately offering a *range* of choices for how you spend the available time—I'm not expecting you to do *everything* that I'm mentioning! To put it mildly, your time will be limited —one *could* often spend *hours* on a single item rather than just a few minutes. I'll try to help you by using the little clock icons. The purpose of jotting down your comments, questions, etc in this way is to serve as "memory joggers" for future reference, and as pointers to issues that you think need particular emphasis or particular extra thought. Some of these memory joggers will be useful to you during the Second Project when you tackle the relationships with the 14 Points and the Deadly Diseases, also with the Major Activity on Day 12, and also—as, of course, I hope you will—when you continue to study and learn from the System of Profound Knowledge long after you have completed this course.

Now, all this may well sound rather ambitious! But don't worry. I know there will be times when e.g. you won't be able to get very far because you don't yet understand well enough what Deming is driving at with a particular item. That is *not* unusual! In such a case, after spending a little time thinking about it but not making much progress, simply move on to the next item. Remember the jigsaw analogy yet again. When you first look at some pieces that you have not yet fitted into the jigsaw, they can appear quite meaningless to you—you just can't see what they are or where they could possibly fit in. But you will be able to see where some *other* pieces can fit in. And eventually, as the picture grows, those pieces will help you to also see where and how your previous "mystery" pieces belong. Therefore when you find items on which, after two or three minutes thought, you feel you can't write down anything very useful at the moment: don't try—their time will come. (But you might then need to interpret the clock icons more flexibly during Step 2.)

Step 3: *DemDim* version

Having finished your detailed work on the individual issues in each half-day, *then* read through the appropriate part of *DemDim* Chapter 18 (irrespective of whether or not you browsed through it earlier). Now and again while doing so, you'll probably find it useful to update some of your earlier comments. The *DemDim* chapter may provide help with some of the questions you had noted down, and certainly will put more flesh on the bones in places. There will also be space for you to note down any additional relevant comments from Chapter 18, since some further issues will have been raised there (for, remember, it was written two years after Dr Deming's material which is reproduced here).

Step 4: Activity (connections with the Points/Diseases)

Here I will first ask you to comment on what you see as the importance of addressing the 14 Points and curing the Deadly Diseases *in light of your learning from that part of the System of Profound Knowledge*. You should not spend long over this. You have already become familiar with the 14 Points and Deadly Diseases on Days 4 and 5, and many of the links with the Joiner Triangle that you spotted there will be relevant here also.

> To support that remark it is worth pointing out that, as you'll probably have realised, there are some pretty obvious connections between the three vertices of the Joiner Triangle and the four parts of the System of Profound Knowledge. For example, the first part of the System of Profound Knowledge is "Appreciation for a System". Surely our thoughts about the horizontal rather than the vertical "organisation chart" are wholly related to "All One Team". Similarly, "Optimisation of a System" and the *aim* or *purpose* of the system must surely have something to do with an "Obsession With Quality". Again, the "Scientific Approach" has clear connections with both the second and third parts of the System of Profound Knowledge: "Knowledge of Variation" and "Theory of Knowledge". Then the fourth part of the System of Profound Knowledge is "Psychology"— *people*—and there can be no doubt that all three emphases from the Joiner Triangle are very much to do with people: how they need to be treated and how they can be enabled to realise their full potential. So, if on Days 4 and 5 you saw plenty of connections between the 14 Points and curing the Deadly Diseases with messages from the Joiner Triangle, you will also immediately see plenty of connections with the System of Profound Knowledge. Use them!

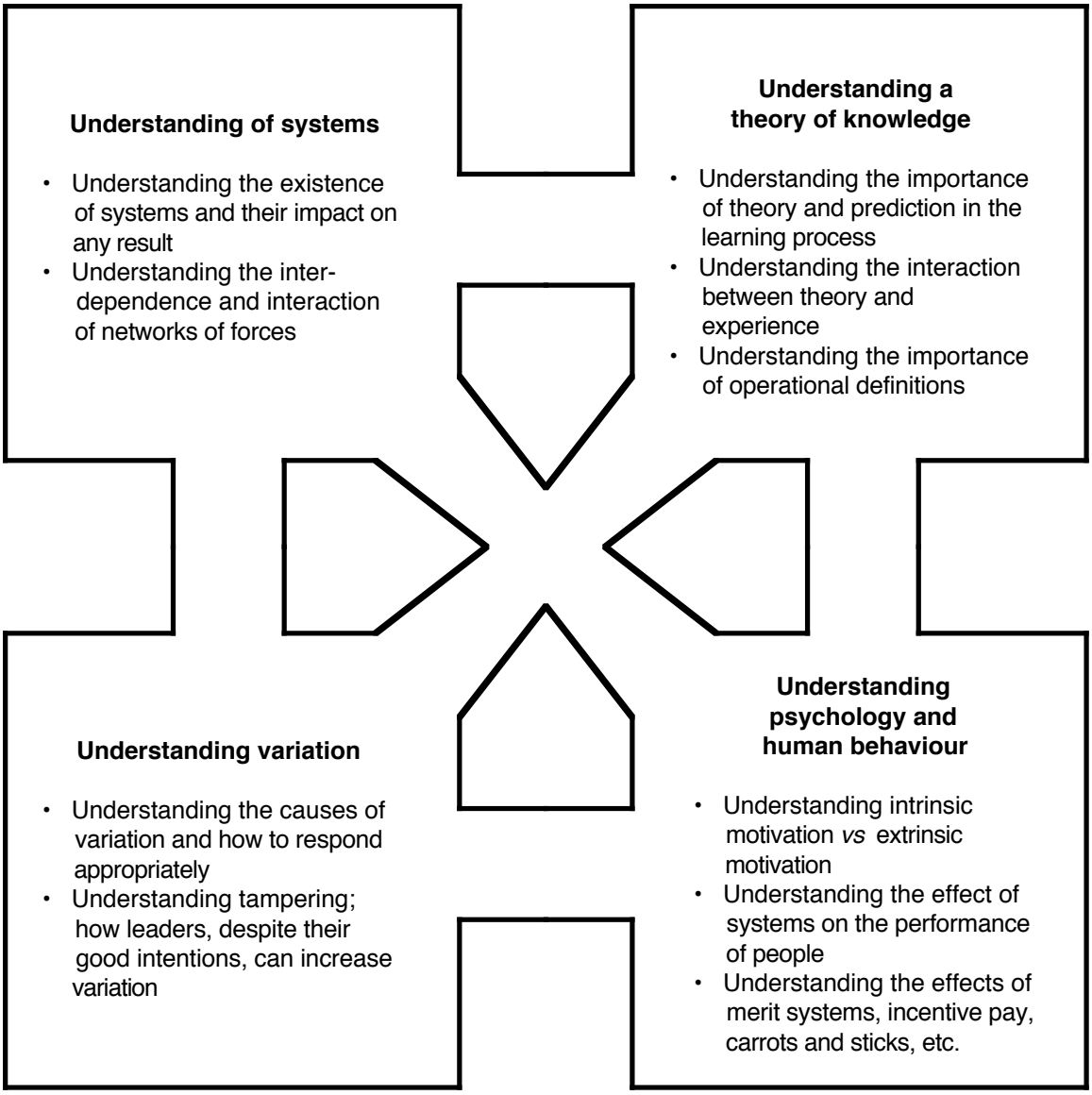
The final phase of the work will be for you to indicate on a simple 0–5 scale what, at that stage, you understand and appreciate as the strength of the links between the relevant part of the System of Profound Knowledge and adopting the Points and curing the Diseases. These data will be used early on Day 12 to provide some personalised guidance for your further study and learning.

Introductions to the System of Profound Knowledge

Yes, "Introductions" in the plural. In order to prepare you as best I can for the coming major project, there now follow not one, not two, not three, but *four* introductions for you! Their natures and content are all very different: yet, of course, they all complement each other. Here again, I am trying to provide for the fact that "people learn in different ways".

It is worth pointing out to start with that, in addition to your being familiar with the 14 Points and the Deadly Diseases from the First Project, you are also already familiar with some of the content of the System of Profound Knowledge. That is quite deliberate: it has been my intention during the course to introduce you to both the content and the nature of the System of Profound Knowledge relatively gradually. From what I have seen, ambitious attempts to plunge into the whole System of Profound Knowledge early on rather than taking it in gentler stages do not work well with most people. I fear that that was also true when Dr Deming attempted it in some of his later four-day seminars. I believe that, for the large majority of people, it's too big and too different for that; it takes time. The taste-buds and the palate—and maybe the stomach as well!—need to become acclimatised. By taking the approach that I have, you will now encounter a mixture of the familiar and less-familiar over these next two Days. That will enable you to both reinforce and deepen what you already know, and also have some time to consider the new material. You *will* still have plenty more to learn: again, the main text from now on will be mostly in Dr Deming's own words—and, as you are already aware, that gentleman could pack a very great deal into a very few words. And that is definitely the case in the May 1990 version of the System of Profound Knowledge. You have been warned!

So, on to our four introductions to the System of Profound Knowledge. First, having recently reminded yourself of Peter Scholtes's diagrammatic representation on Day 1, you will immediately recognise what follows—his own expansion of that diagram to include a few important aspects of each of the four parts:



Particularly in your early days of learning about the System of Profound Knowledge, Peter's diagram here is well worth repeated attention. Although there are only two or three entries in each part, they are enough to remind you of the type and flavour of the content of each of the four parts, rather beyond that which merely their titles might imply. Take a little time to look through them carefully, say, three or four times before continuing.

> Advance notice: On Day 12, for still further learning and also amusement, we shall see Peter's superb parody of the above diagram: "A System of Profound Trouble"!

Second, we have the short introduction to the System of Profound Knowledge in *DemDim*. Soon after you start reading it, you will recognise that it is not in my own normal style of writing! No, in fact almost all of the main text in Chapter 18 from this point onward is in Dr Deming's own words, with my contributions appearing in small print. However, both in that introduction and with each of the four parts, I was quoting from a variety of his presentations and writings. Therefore there is generally rather more text in my Chapter 18 than there is in Dr Deming's May 1990 version, including some material from his later versions. Never-

theless, his exceptional conciseness of style will still be well in evidence throughout the rest of Chapter 18. **I suggest you now read this introduction (*DemDim* from the bottom of page 261 through to page 264) two or three times before continuing.**

Third comes Dr Deming's own introduction to the May 1990 version which you'll find on pages 24–25. But, before embarking upon that, I will tell you about the fourth and final introduction. This is what I've already highly recommended to you on page 19. It is of a totally different nature from the other three—it's rather longer, but is easier to read!

Balaji S Reddie, based in Pune, India, began to become familiar with Dr Deming's work around 1995. I was delighted to be able to encourage and tutor him (largely by telephone), and he proved to be a most willing and rewarding student. I was also pleased to be able to visit him in 2001 and to present seminars on his behalf in both Pune and Chennai.

A few years ago, Balaji wrote a series of 25 short newspaper articles to introduce readers to the System of Profound Knowledge—a rather ambitious task! By "short" I mean barely one page each in terms of the format and size of type being used in this course material. He largely achieved this through the inclusion of numerous short real-world illustrations to aid the readers' understanding of the concepts that he introduced. When Balaji sent me these newspaper articles after they had been published, I was tremendously impressed by how much of the essence of each of the four parts he had been able to include in such a small space, and to do so in a manner that is both eminently readable and enjoyable. Of course, it is no "complete coverage", but that is not needed in an introduction.

As I was developing the current section of the course, I realised that the content of his series of short articles could be extremely valuable to *12 Days* students. Relatively "gentle" and light reading on the System of Profound Knowledge is hardly easy to come by! Balaji was kind enough to give me permission to use his material and to amend it into whatever form I thought most suitable for inclusion here. I have therefore taken the articles relevant to each part of the System of Profound Knowledge and moulded them into a continuous read, rather than retaining all the discontinuities of the original individual articles. I have also added a few references to other material in the course, so that Balaji's writing really does now become an integral part of the whole. Similarly, I have now inserted into Days 10 and 11 a number of pointers to useful links with what Balaji has written, although without any attempt to mention them all.

There were around five of Balaji's short articles relating to each of the four parts, plus a summing-up as the final article of the set. We have called the revised format "Four Preludes and a Coda" (continuing the musical analogies of the "Overture"!). A few of the articles toward the end of the series were more concerned with both good and bad efforts to put theory into practice, rather than with the theory itself, and so those will form the basis of a final contribution which is more appropriate as additional reading on Day 12.

There will be time for you to read through the whole of the "Four Preludes and a Coda" today. Also I am sure it will then be well worth your while to read it again sometime before you begin the Second Project on Day 10. Next, as I implied on page 19, I strongly recommend that you include the relevant "Prelude" within the browsing session that begins your study of each of the four parts. Indeed, I suggest you *start* your browsing session with it in order to remind yourself of what's there before doing anything else.

And finally we reach Dr Deming's own introduction to his May 1990 version. Like the first two introductions, this is quite short and, as with them, will be well worth reading slowly and carefully several times. At this stage, I guess I hardly need to emphasise that, however often you read it (as with Deming's writing elsewhere), you shouldn't expect to understand everything straightaway! By now you know that his writing contains great depth: it is designed to make you think, and to make you search. If you'll be guided by my

experience, believe me in that the more you search then the more you will find—sometimes soon, sometimes later!

So, as with the introduction in *DemDim*, all the main text in what follows is Dr Deming's. My own comments within his writing appear in italics and are enclosed in square brackets. The same will generally be true on both Days 10 and 11. I have added more to Day 11 than to Day 10, since Day 10's material will be more familiar to you as it stands compared with that of Day 11.

Dr Deming's short introduction here skilfully launches important material from all four parts of the System of Profound Knowledge and also demonstrates several links between the parts, thus confirming the truth of his opening description.

The System of Profound Knowledge appears here in four parts, all related to each other:

A. Appreciation for a system
B. Some knowledge of theory of variation (statistical theory)
C. Theory of knowledge
D. Knowledge of psychology

One need not be eminent in any part of Profound Knowledge in order to understand it as a system, and to apply it. *[It is indeed possible that "eminence" in one part could prove to be a hindrance: you might then be more interested in developing your expertise in that one part rather than learning about the other parts and the links between them and your speciality.]*

The 14 Points for management in industry, education, and government *[a neat reminder of the full title of* The New Economics*]* *follow* naturally as application of the System of Profound Knowledge, for transformation from the prevailing system of management *[which can be described as suboptimisation]* to one of optimisation.

The various segments of the System of Profound Knowledge can not be separated. They interact with each other. Thus, knowledge of psychology is incomplete without knowledge of variation. If psychologists understood variation, as learned in the Experiment on the Red Beads, they could no longer participate in continual refinement of instruments *[tools, devices, formulae, etc]* for rating people.

A manager, in the role of leader of people, must have some knowledge of variation and of psychology.

Management of a system is action based on prediction. Rational prediction requires systematic learning *[as a good example, learning through the PDSA (Plan-Do-Study-Act) cycle which we shall cover on Day 11]* and comparison of predictions of short-term and long-term results from possible alternative courses of action.

Theory of variation *[i.e. statistical theory]* can play a vital part in optimisation of a system. Statistical theory is helpful for understanding differences between people and the systems that they work in.

> *[Optimisation of a system surely includes elimination of wasteful, undesirable variation. Inability to distinguish between variation caused by the system and that which might e.g. be due in some way to people who work within it thus prevents optimisation: indeed, as we know from the Funnel Experiment, it may well make things much worse.]*

Assistance to systematic learning is a speciality of the statistician *[or, at least, that is so in Dr Deming's wise view of what a statistician should be].* Statisticians that understand a system and optimisation thereof, along with some theory of knowledge and something about psychology, could apply their specialised knowledge of variation toward continual improvement of methods for better prediction, and hence for better management. They could help people to retain their intrinsic motivation to learn. Statisticians that understand their unique role will no longer teach tests of significance, tests of hypothesis, chi-square.

> *[These techniques from "conventional statistics" are only appropriate for so-called "enumerative studies". What ability do such techniques have to predict, to aid improvement? Are they designed for that? This will be covered in Paragraph 9 of Part B (on Day 10 page 25 [WB 176]) and additional discussion there. A brief description of "tests of significance, tests of hypothesis" is included on the final page (page 55) of Part D in the Optional Extras section. The meaning of the term "enumerative studies" and discussion of why they are inappropriate for interpreting process data are matters covered in Part C of the Optional Extras.]*

Statistical theory, used cautiously, with the theory of knowledge, can be useful in the interpretation of the results of tests and experiments, to understand cause-and-effect relationships. The interpretation of the results of tests and experiments is for future use: prediction.

If economists understood the theory of a system, and the role of cooperation in optimisation, they would no longer teach and preach salvation through adversarial competition. They would, instead, lead us into optimisation, in which everybody would come out ahead, including competitors.

> *[Useful reading on the advantages of cooperation over competition is to be found in the books* No Contest *by Alfie Kohn* and Beyond Negotiation *by John Carlisle and Robert Parker.]*

Indeed, if any two or more companies or institutions put their heads together for uniform prices, they would be fools to set the price higher than what would optimise the whole system—they themselves, their customers, suppliers, employees, and the communities that their people work in.

The theory of knowledge helps us to understand that management in any form is prediction. *[For example, the moment you contract to do or sell something for a particular price, you have* ***predicted*** *that some people will buy it, that it can be done for the price, that delivery on the agreed timescale can be achieved, that it will make a reasonable profit, etc.]* The simplest plan—how may I go home tonight?—requires prediction that my automobile will start and run, or that the bus will come, or the train. Management acts on a causal system, and on changes in the causes.

> *(The main substance of this final paragraph will be revisited at the start of the Theory of Knowledge section on Day 11 page 4 [WB 186].)*

"OUT-OF-HOURS" PREPARATION FOR THE SECOND PROJECT

As you know, I have not been asking you to do any significant amount of work *between* the individual days of this course. But now, as we approach the Second Project, some prior preparation becomes highly advisable. The Second Project is the climax of your learning about Dr Deming's theory of management in this course: it is a both substantial and vitally important piece of work. So here I'll give you some guidance on what I believe you will find fruitful to do "out-of-hours" before you begin Day 10 and then, to a shorter extent, before Day 11. The amount of time advisable to spend on this preparation is, say, an evening between Days 9 and 10 and another hour or so before Day 11. I think you will find the type of preparation I suggest here will then pay considerable dividends as you work through the project.

My recommendations here will be in three sections, and I suggest you think of spending an hour or so on each of these sections during your preparation before Day 10. However, the preparation you do on two of the three sections will be adequate for *both* Days 10 and 11, and so you will only need to work with the one remaining section in your preparation prior to Day 11.

First, you have seen that the final step in the four-step procedure described on pages 19–21 is for you to think about the links between each part of the System of Profound Knowledge and our old friends from Days 4 and 5: adopting the 14 Points and curing the Deadly Diseases. This coalescence of Dr Deming's main emphases in the 1980s with those in the 1990s is, of course, a continuation of our gluing together lots of components of his teaching into a solid, secure whole for which I have often used the analogy of fitting pieces into a jigsaw. (I am, of course, not forgetting about understanding variation, but that emphasis was *always* there.) However, as you haven't seen anything of the 14 Points and Deadly Diseases since Day 6, it would be good to refresh your memory about them during your preparation for this Second Project.

Second, you have now seen three short introductions to the System of Profound Knowledge: Peter Scholtes's diagram, the introduction in *DemDim* Chapter 18, and Dr Deming's own brief introduction to his May 1990 version. Following this current section here I shall ask you to read through Balaji Reddie's excellent material that I introduced to you on page 23. For your out-of-hours preparation I shall mainly guide you to spend some more time with Balaji's writing in conjunction with *DemDim* Chapter 18 while also keeping an eye on Peter Scholtes's diagram. This more substantial introductory learning about the System of Profound Knowledge will give you a good grounding in readiness for the project.

Finally, and particularly important, you will need to thoroughly familiarise yourself in advance with, as it were, the *mechanics* of the Second Project, i.e. what you will be doing at each stage of the four-step procedure. You'll recall that, rather than my laying down the law about precisely how you should carry out those four steps, I am suggesting various options to you from which to choose. Obviously, it would be sensible for you to consider these options beforehand and figure out what choices most appeal to you rather than spending lots of time trying to decide on them once the project is under way.

So let's take these three sections of your preparation in turn. Incidentally, it will aid your progress with the Second Project if you are able to make a few photocopies prior to Day 10 in order to avoid too much flipping backwards and forwards in the course material during the project. I'll summarise details on page 30.

First, for your refresher on the 14 Points and Deadly Diseases, you could of course return to the main reading referenced on Day 4, namely *DemDim* pages 39–52. There is also the whole of Part 5 of *DemDim* and, if you have it, *Out of the Crisis* pages 17–107[18–126]. But, obviously, either of those would need some remarkably fast reading if you were working on my suggested timeframe!

Instead, I think it would be very useful for you to simply revisit your work on the First Project (Days 4 and 5). Not only will this automatically remind you of what the 14 Points and Deadly Diseases actually are, but it

will also remind you of how you linked them there to the three bases of the Joiner Triangle. Why this will be particularly useful is that similar kinds of thought processes to those that you used there will also be appropriate for the Second Project. The reason will be immediately clear if you refer back to my small-print paragraph on today's page 21: i.e. there are some clear relationships between the Joiner Triangle's three bases and the four parts of the System of Profound Knowledge.

While reading through my descriptions and your work in the First Project, you will find it very helpful to use the table on page 28 *[WB 150]* on which to summarise the strengths of the links that you saw on Days 4 and 5 between the bases in the Joiner Triangle and adopting the Points and curing the Diseases. Then, when thinking of referring back to your work there while carrying out the Second Project, your entries in this table will give you some good clues as to when and where it will be worth your while to look back. I suggest you use the same kind of 0–5 scale in this table as you used during Day 6 (ranging from 5 = very strong relationship to 0 = no apparent relationship).

For the second section of your preparation (your general grounding in the System of Profound Knowledge before tackling the detail during the project) I suggest the following. First, it would be a good idea to always have a copy of Peter Scholtes's diagram from page 22 in front of you to remind you of a few of the main features and nature of the content of the System of Profound Knowledge. Next, remember that this afternoon you will soon be reading through Balaji's Four Preludes, relating respectively to the four parts of the System of Profound Knowledge. I also recommend that, at the end of this afternoon, you should read through the rest of *DemDim* Chapter 18 (pages 264–280) in order to get a more comprehensive idea of what Balaji's Preludes are introducing you to!

Day 10 is only concerned with Parts A and B of the System of Profound Knowledge, so you can concentrate just on those two parts in your preparation before Day 10. Then, of course, your preparation for Day 11 will concentrate on Parts C and D. I suggest the following for each of the four parts. First, re-read Balaji's corresponding Prelude. Then go carefully through the few (between three and six) relevant pages in *DemDim*, jotting down some notes to record where you see the links between Balaji's material and the *DemDim* material. These notes will then be able to guide you about the links when you get into the Second Project itself.

Finally we come to the reminders about the four-step procedure to be used for each of the four parts. The procedure will be identical for each of Parts A, B and D except that the time allocated will differ according to the amount of work there is to do. The procedure will be modified for Part C because of its different structure, but I'll leave the details until Day 11.

As suggested a little earlier, in order to avoid wasting precious time during the project, it will be wise for you to (a) familiarise yourself with the four-step procedure during your preparation session and also to (b) consider if there are any of the range of choices I have suggested which either particularly appeal to you or, on the other hand, you feel you are not really interested in doing. So I recommend the following:

First, carefully re-read my descriptions of the four steps, starting on page 19. There you'll need a copy of page 29 *[WB 151],* the one-page summary of the whole four-step procedure: this focuses on the various choices I have already suggested to you along with one or two more. Think about these and then highlight any that particularly appeal to you and strike out those that you wish to reject. You could, of course, add further choices of your own. And then, throughout the Second Project, refer to your annotated version of page 29 *[WB 151]* to guide you through the procedure each time.

To conclude Day 9, however, **please now move over to page 30** to think about which parts of the material you might like to duplicate to avoid having to keep frequently skipping around during the project!

Pages 28–29 are used in the "Preparation for the Second Project" (see page 27) and are also on Workbook pages 150–151.

	Obsession with Quality	All One Team	Scientific Approach
14 POINTS 1. Create constancy of purpose			
2. Adopt the new philosophy			
3. Cease dependence on mass inspection			
4. End lowest tender contracts			
5. Constantly improve systems			
6. Institute training			
7. Institute leadership			
8. Drive out fear			
9. Break down barriers			
10. Eliminate exhortations			
11. Eliminate arbitrary numerical targets			
12. Permit pride of workmanship			
13. Encourage education			
14. Clearly define top management commitment and action			
DEADLY DISEASES 1. Lack of constancy of purpose			
2. Emphasis on short-term profits			
3. Performance appraisal			
4. Management job-hopping			
5. Running a company on visible figures alone			

Summary of the four-step procedure

Step 1: Browsing session

Suggestions:

- Read the relevant part of Balaji's "Contributions" (around six pages);
- Read the relevant part of *DemDim* chapter 18 (average of four pages);
- Browse through the material for the half-day up to, but not including, the Activity.

The purpose of this browsing session is similar to a gymnast's "limbering-up" session before getting onto the strenuous exercise. The difference is of course that, rather than limbering up your muscles, you'll be limbering up your brain!

Step 2 *[analogous to the gymnast's "strenuous exercise"!]*: Dr Deming's May 1990 version

Choices for your work on each item (remember: "*choices*"—not to attempt them all!)

- Immediate reactions upon reading it (e.g. "Really important", "I'm already familiar with this", "My organisation is doing the direct opposite to this", "Why is he saying this?", "What does he mean by that?", "What does this imply?", "Why is my organisation doing the direct opposite to this?", "What would be the benefits if my organisation *stopped* doing the direct opposite to this?".
- Try to answer one or more of those questions.
- Note down any illustrations from your own experience relevant to this item.
- If your initial reaction was something like "I'm already familiar with this", try writing a brief explanation of the item to your friend who is not yet familiar with Dr Deming's work.
- Further, with Step 4 in mind, I'll include an additional suggestion: immediately note down any links to any of the 14 Points or curing the Deadly Diseases that occur to you.

Step 3: *DemDim* version

Read the relevant part of *DemDim* Chapter 18 (irrespectively of whether or not you browsed through it in Step 1) and, while doing so,

- see if you need to update some of your earlier comments;
- see if you can answer any of your earlier questions;
- comment on matters included here which were not in the May 1990 version, and again make a note of any further links with the 14 Points and/or the Deadly Diseases.

Step 4: Activity (connections with the Points/Diseases)

First, use your notes made with respect to the final bullet-points in both Steps 2 and 3 above to jot down relevant comments against some of the Points and/or Diseases. Next, with the aid of your table on page 28 *[WB 150]*, add further comments prompted by your considerations during the First Project. Lastly, read through Dr Deming's words in Step 2 one more time and then trace through the 14 Points and Deadly Diseases in turn, seeing if any further inspiration strikes you! Finally, and fairly speedily, allocate your scores on the 0–5 scale indicating what you now perceive as the strengths of the links with the current part (A, B, C or D) of the System of Profound Knowledge.

You should have arrived here after page 27.

"Out-of-hours" note

The most obvious pages from today's material that are worth you reproducing separately for your convenience during the Second Project are:

- page 22 (Peter Scholtes's diagram);
- page 28 *[WB 150]* (after you have used it to summarise your work when looking back to what you wrote during the First Project);
- page 29 *[WB 151]* (similarly including your annotations on that summary of the four-step procedure).

If it is convenient for you to carry out a relatively large amount of printing or copying, I would suggest Balaji's Four Preludes (not necessarily the "Lessons from History" section as that is more relevant to Day 12). You could then have the relevant Prelude immediately accessible to you during *both* Steps 2 and 3 and could also insert notes on it for your reference as you work through the rest of the four-step procedure.

You've had a *lot* of hard thinking to do today. But now it's time for you to read through Balaji's "Four Preludes and a Coda" (file Q). So relax, put your feet up, and enjoy!

And lastly, read through the *DemDim* coverage of the System of Profound Knowledge: either pages 264–280 of Chapter 18 or the whole chapter for completeness. Again, as you've been working very hard today, this is just an initial browse-through to get an idea of what's there, rather than any real study. Remember that (although not printed in blue!) most of what appears in Chapter 18 is in Dr Deming's own words. There will therefore be some overlap with what you will be seeing on Days 10 and 11. You'll have much more time to study these pages from *DemDim* (just one part at a time) during your out-of-hours preparation sessions before Days 10 and 11. But, even during this first quick look, I think you will find several points of contact with what Balaji has just introduced to you this afternoon.

When you begin your out-of-hours preparation work, start at page 26 and then follow the guidance as indicated.

Approvals, Acknowledgments and Information

[a] (page 3) Dr Deming's presentation at the Queen Elizabeth Conference Centre in London in July 1990 is fully transcribed in the Deming A5 Booklet A10 (formally BDA Booklet A10): *Deming Speaks to European Executives*, available from the Deming Transformation Forum: www.deming.org.uk.

[b] (page 9) This diagram from *Deming's Road to Continual Improvement* has been reproduced with the approval of Bill Scherkenbach and SPC Press Inc.

[c] (page 11) The May 1990 version of Dr Deming's System of Profound Knowledge which is used during Days 9–11 is fully transcribed in the Deming A5 Booklet A9 (formally BDA Booklet A9): *A System of Profound Knowledge*, available from the Deming Transformation Forum: www.deming.org.uk.