Miscue Analysis



Miscue analysis

Miscue analysis is a tool for looking closely at the types of reading strategies a reader uses. The kinds of miscues (incorrect guesses) a reader makes when reading from a text will give the listener clues about how familiar or unfamiliar the reader finds the content matter, and how easy or difficult they find the text to read. Reading tests do not give this sort of information because reading is so much more than just looking closely at each letter and every word.

Goodman (1969) who first coined the term 'miscue analysis' based his approach on three 'cueing' systems he believed underlay the reading process.

- Grapho/phonic the relationship of **letters to sound** system
- Syntactic the **syntax/grammar** system
- Semantic the **meaning** system

Goodman was anxious to get away from the notion that every departure from the words of the text is necessarily bad. The pattern of miscues can suggest a reader's strengths as well as their weaknesses. If we put together the miscues with what the learner can tell us about how they were made, then we can begin to understand what is really going on when a text is read

Here are some examples of miscued text with information about how the miscues inform us about the reader's skills

Actual passage from book

Now John Cameron lived alone — apart from his household robot. And his life certainly did run smoothly. Some people changed their robot's programme every day, and left it in the 'Transit' position, that is, ready to receive orders. But not John.

He was a rigid man who hated change. He wanted every day to be the same as the one before. So HIS robot was programmed once and for all.

One weekend, he sat down after breakfast as usual, and watched his robot clear up the dishes. There were times when he felt almost fond of it. It was the silence he liked. Robots never argued — not like wives.

(From 'Knockouts' The Man Who Loved Robots' by Jan Carew)

Passage as read by student

Now John Cameron lived alone — apart from his household robot. And his life certainly did run smoothly. Some people changed their robot's **performance** every day, and left it in the 'Transit' position, that is, **reading** to receive orders. But not John.

He was a rigid man who **hadn't changed**. He wanted every day to be the same as the one before. So HIS robot was programmed once and for all.

One weekend, he sat down after breakfast as usual, and watched his robot **clean clear** up the dishes. There were times when he felt almost **found fond** of it. It was the silence he liked. Robots never argued – not like wives.

(Extracts taken from the Adult Literacy Unit's *Newsletter No 5* 1979, from an original article written by Margaret Walsh.)

In this piece of text the reader substituted the following words:

• performance for programme, reading for ready, hadn't changed for hated change, clean for clear (but corrected) and found for fond (immediately corrected).

The reader substituted noun for noun, and verb for verb clause. The substituted words look very similar and do not dramatically alter the sense of the passage. The self corrections were made immediately as the reader realised that what s/he had said did not make sense in the context.

The reader is reading using all the cues i.e. grapho/phonic (look of the words), semantic (meaning of the words) and syntactic (grammar – the sound of the words).

S/he was reading for meaning.

Actual passage from book

Wild Wheels

In the early days of the cinema, the film star was often on a train. Stuntmen jumped on to trains from bridges, dropped on to trains from planes, fought on trains, ran along the tops of trains, jumped from trains to the ground, and on to trains from horses.

Fights on top of a train are not easy. A train not only runs forwards, it also moves from side to side. And winds can be strong. In the cinema, we think one fighter is trying to throw the other off. Often, he's really trying to hold him on.

Today we more often see fast cars in films. In the early cinema, cars were usually funny. Not now.

In the early days of the cinema stuntmen jumped on to trains from bridges.

(From 'Stunt' by Lewis Jones published by Longman)

Passage as read by student

Wild Wheels

In the early days of the **camera**, the film star was often on a train. Stuntmen jumped on **the** trains from bridges, **dropping from** to trains from **plans**, fought on trains, ran along the tops of trains, jumped from trains to the ground, and on to trains from **arches**.

Fights on top of a train are not easy. A train not only runs forwards, it also moves from side to side. And winds can be strong. In the **camera**, we think one fighter is trying to throw the other off.

Often, he's **already** trying to hold him on. Today we **move** often see fast cars in films. In the early **camera**, cars were usually funny. Not now.

Note: The reader was content to stop without reading the final sentence.

Let us consider this piece of text called *Wild Wheels*. This reader made the following substitutions:

• camera for cinema, the for to, dropping from for dropped on, plans for planes, arches for horses, already for really and move for more.

In nearly every case the substitution changed the meaning of the sentence and the passage. This made the substitution unacceptable. The reader has however chosen words that **look** like the original except, perhaps, arches for horses. The reader is paying no attention to the meaning of the passage and just appears to want to just get through it!

It could be a suggestion that because the reader has substituted **plans** for **planes** that he needs to work on e-controlled vowels; however, it would probably be more helpful if s/he was encouraged to think more about the **meaning**.

Using small, gapped (cloze) passages could encourage the learner to predict and therefore boost the other parts of the reading cueing system s/he is not using so well – context (semantic cues) and grammar (syntactic cues).

Of the two readers, the first was more proficient. This is not because of the number of miscues but the **kind** of miscues. By examining the miscues of the first reader we know that s/he searches for meaning. S/he is not just 'barking' at print, i.e. either reading word for word, decoding as s/he goes, or reading quickly and very inaccurately by being drawn to the shape of the words.

Selecting a reading passage

It is necessary to select an unknown passage, at the right level, in order to generate errors and to assess learners' reading skills in relation to the demands of their jobs or courses and/or life in general. If the learner is following a particular course of study then it is helpful to select a typical passage from their course material to carry out the miscue analysis.

It is useful to map the text to the curriculum to ascertain the reading level to ensure that the learner is not trying to tackle too demanding a text.

You can also do a readability analysis of the text using Fogg or Smog readability tests, although this is less reliable as an indication of level in curriculum terms. It is important to realise that the 'readability level' produced from this analysis is only a guide to the difficulty of the passage and is **not** the reading age of the learner.

If the learner is an absolute **beginner reader** (at Milestones 7 and 8 or just Entry 1), using miscue analysis will be inappropriate. The learner may not have an adequate grasp of phonics and may have to rely entirely on semantic cues. It has been found that unskilled readers are also poorer at using context to help them read. The information gained from miscue analysis would be minimal.

It is a good idea to give the learner a choice of texts. This involves the reader and is more likely to provide motivation to read the selected passage. You should have about three or four texts; fewer than that may leave the learner stuck for choice, while more than that can overawe them. You need to give the learner enough to read to enable you to hear the miscues and to establish whether the learner finds it increasingly difficult as s/he goes on (or, conversely, whether s/he gets into the swing of the author's style and improves). A general guide is about 100 or so words at Entry 1 and 200 words at Entry 3. A longer piece of text can be used at Level 1 and Level 2.

What you will need to carry out a miscue analysis

Preparation is the key to carrying out a miscue analysis. You will need to ensure that you have the **optimum environment** for the **time** that it will take to carry out the procedure. You will also need copies of the texts for the learner to use and your own copies of the text enlarged on to A3 paper to allow ease of scoring and comment. It is useful to have the actual copies of books from which texts are reproduced as many learners like to make choices using the 'look and feel' of the book (e.g. cover illustrations/synopsis on the back cover/relevance to training or education). Finally, you will need a good quality tape recorder, with a microphone.

For miscue analysis you will need the following.

- A guiet room for the time you need (about half an hour is usual)
- No interruptions
- No telephones
- A comfortable desk and chairs, with the learner sitting with her/his back to the window if possible so that s/he can read by natural light. If artificial lighting is used (in the evening or on a winter day) try to ensure that there is clear, direct light on the text with no shadows and no faulty strip lighting.
- A good quality tape recorder and microphone with a clean tape

For the learner

- Good quality photocopies of the text from which the learner may choose, or the pre-selected text. Do not use poor quality photocopies, as you will not be able to rely on the results.
- The font size may be increased if the learner has any visual difficulties. Otherwise,
 12 point is the minimum.
- Text may be photocopied on to coloured paper if the learner has Myers-Irlen syndrome. However, it is interesting to note the differences and additional difficulties faced by the learner when reading from text on white paper.

For the assessor

- Copies of the text enlarged on to A3 paper or double spaced on A4
- Pens to score and make comments. A colour is useful as the scoring stands out. Do not expect to do much of the scoring while the learner is reading: the tape is there to allow you to listen, reflect and score the miscues after the learner has gone. It is better to use your time observing the learner and checking their understanding of the text at the end.

Scoring system

Errors can be recorded in different ways but the following includes the most useful. (Chart adapted from M.Walsh, June 1979.) It is important when carrying out a miscue that you tape-record it. It is far too difficult to carry out a running analysis. The ability to rewind the tape and hear things again is essential for accurate marking.

Miscue	Symbol	
Non-response		Use a broken line to indicate an inability or refusal to attempt a word
Substitution	Play work	Write the substituted word above the appropriate part of the text If a learner uses a non-word, record it reflecting the grapho/phonic cues being used e.g. phenomena pronounced as fu – hon – ma should be written as phuhonma, showing their knowledge of ph
Insertion	his for work	Indicate by using an insertion sign and writing the word above
Omission	work	Circle the word, words or parts of words missing
Repetition	work	Underline the words repeated
Correction	play work ©	Place a small c beside the corrected word Place an MC for miscorrection
Reversal	work <u>hard</u> o n	Symbol that shows which part of letters, words, phrases or clauses have been interchanged
Hesitation	work / hard work // hard	Indicates hesitation between two words Indicates extra long hesitation

Analysing miscues

The following coding system is adapted from Goodman, K. S, 1969. 'Analysis of oral reading miscues: Applied psycholinguistics', *Reading Reasearch Quarterly,* 5, 9-30. It has been modified to aid accurate assessment of reading difficulties.

Each error made is coded for all three cueing systems.

- 1. The grapho/phonic system
- 2. The semantic system
- 3. The syntactic system

1. The grapho/phonic system

Some examples of miscue with **effective** grapho/phonic similarity (+):

Text	Miscue	
waist	wrist	
straightened	strengthened	
owing	owning	
detriment	determent	

You will see that the miscued words are almost identical in length and shape to the original words. The choice of words would not alter the meaning of the text to a serious extent. The author's intent will stay mostly intact.

Examples of miscues with **partial** grapho/phonic similarity ():

Text	Miscue	
present	patient	
fortitude	fortunate	
sedately	sadly	
acclimatisation	accumulation	

Examples of miscues with little or no grapho/phonic similarity (0):

Text	Miscue
present	perched
almost	awfully
usual	surface
flickering	blinking

2. The semantic system

How acceptable is the miscue in terms of the text's meaning?

Semantic strength is **high** when the original meaning of the sentence is relatively unchanged. Most miscues will modify the meaning to some extent, but they are acceptable when they are close to the author's meaning.

Semantic strength is **partial** when the miscue is appropriate within a single sentence or part of a sentence but not within the overall context e.g. horse/house.

Some examples of miscues with **high** semantic acceptability (+):

Text	Miscue	
violent	volcanic	
disruptive	destructive	
afford	offer	

Examples of partial semantic acceptability ():

Text	Miscue	
pigeons	penguins	
rewarded	regarded	
species	special	

Examples of **poor** semantic acceptability (0):

Text	Miscue	
pigeons	pigments	
owner	over	
present	parent	

3. The syntactic system

Does the miscue work grammatically in the context of the sentence? Miscues are either appropriate or not appropriate.

Examples of miscues that show syntactic **strength**, i.e. that are syntactically appropriate (+):

Text	Miscue
(send him as a) present	patient
(he had huge) arms	hands
fully (mature)	finally

Examples which show syntactic weakness, i.e. that are not syntactically appropriate (0):

Text	Miscue
(was quite) devoid (of hair)	devote
(both) sides (of his face)	besides
(a) glitter (of ironic laughter)	greater

In trying to identify which of the three systems the miscue fits into, it is best to choose the most obvious. However, there will always be times when a miscue could fit more than one system; e.g. if someone says **waist** for **wrist** we have noted that this is an effective grapho/phonic miscue, but arguably it also has a semantic and a syntactic acceptability. The important thing about this sort of miscue is that it probably does not affect the overall meaning of the text and unless the reader made many errors of this sort, it could be pointed out, but not dwelt upon.

(Examples adapted from *Diagnosing Dyslexia* by Cynthia Klein, Basic Skills Agency, 1993)

Miscue Analysis Form		Date				
Learner's name		Reading level				
Script	Miscue (substitutions)	Grapho/phonic Visual Auditory	Semantic	Syntactic	Non- response	Corrections
No. of repetitions		No. of i	nsertions			
		No. of c	orrections			
Observations fromReads word for we	_			voslno		
	ay with little intonation	n		yes/no yes/no		
 Reads missing out lines or losing the place in the text 			yes/no			
Reads without regard for punctuation			yes/no			
Reads stressing every syllable				yes/no		
Reads fluently with hesitation only before difficult words Reads paying after phrases and whole centences at punctuation points.			yes/no			
Reads pausing after phrases and whole sentences at punctuation pointsUnderstands the overall meaning of the text			uon points	yes/no yes/no		
Strengths and weaknesses:						
-						

What does the reading miscue analysis tell you?

word attack skills – little acceptable (i.e. close to the	The learner is drawn by the word to come and is	If the omission is of small regular words it may be
system. system) and semantically acceptable it may be that the learner is rather impulsive and needs to slow down a bit. The learner is unwilling to hazard a guess so is probably not using context to help. This is an anxious reader unwilling to 'fail' in public. It is important here to ask the learner what is happening when they see a word that is totally.	already trying to make it semantically acceptable to him/herself. This is not a word-forword reader and s/he is maybe reading a little too fast. However, if the inserted words do not affect the meaning, do not overstress the miscues. If the insertions are additional endings e.g. full(y) (syntactic errors), it can sometimes alter the meaning – these need to be pointed out.	ignored if the meaning is not compromised. Nonetheless a word like not being left out could alter the meaning. Reading a little too quickly may again be the cause, or weak sight word vocabulary. If lines are omitted it may show poor eye tracking skills. It is worth noting where words are left out e.g. at the ends of lines, around the middle parts of the text or before a difficult word.

Repetition	Correction	Reversal	Hesitation
Frequent repetitions show the learner is searching for and consolidating meaning – this is what a good reader does. If repetition is too frequent it may mean that the text is too hard and the flow is interrupted at the expense of comprehension. It is worth looking to see if the repetitions come before a tricky word. If they do, the learner may be 'buying some time' to prepare to decode the word.	Good corrections show the learner is aware of the meaning. If the corrections are quite frequent then the learner may be reading a little too fast and is drawn visually to the shape of the words before applying meaning. Too much overcorrecting, even on words that do not alter the meaning, may ultimately affect the learner's understanding of the text. A learner who does not see himself as a good reader may miscorrect accurate reading.	Reversal of words/phrases in a sentence may have little detrimental effect on the overall meaning of the text and need not cause too much concern. Reversals, however, may have an effect on the grammar and lead the learner to compensate for the altered order of thoughts e.g. forcing different verb endings. Reversal within a word itself e.g. was for saw may have little effect on the meaning, but sometimes it can (e.g. on for no). This kind of reversal often happens with small high- frequency words.	A learner who does not think of himself as a good reader may be hesitant. Weak visual and/or grapho/phonic skills may force the hesitations. The text may be too hard – but if the learner has to read specific course material then this may be unavoidable. Observe where the hesitations occur – if it is always before a tricky/unknown word, the learner is aware of what is to come and is already preparing for it. If the hesitation is at the end/start of a new line it may indicate that the learner is not tracking the text as smoothly as they might.

It is important to stress that what counts is not **what** is read, but **how the learner goes about reading it**. We may find that it is not necessary to correct every word if meaning is not compromised. The value of miscue analysis is that it gives the teacher information about the learner's reading strategies.

Miscues tell us whether a reader is understanding and seeking meaning from the text.

What do we learn about the three learners who read the same piece of text? Look at each learner's responses and decide:

- what sort of miscues have been made
- whether the miscues alter the meaning of the passage
- if the reader would be likely to retell the passage accurately in her/his own words.

I live in a flat and look after myself.

the S
As my clothes get dirty I put them in a black/plastic bag which is/delivered by the council for rubbish.

On the weekend I take the bag to the launderette.

One day I left it with the attendant lady. She said I could pick if up in an hour.

Well I went for a pint in the pub. Then I went back to the launderette. As soon large as I opened the door the lady was waving her hands and pointing to a load of rubbish. I soon/realised that I had left the weekly rubbish bag by mistake.

Reader A is going to miss the main meaning of the passage by being unable to read or 'guess' the word **launderette**. This reader does not attempt to apply grapho/phonic knowledge. S/he appears to have few reading strategies to rely on when words are not recognised on sight.

I live in a flat and look after myself.

cloth

As my clothes get dirty I put them in a black plastic bag which is delivered by the council for rubbish.

lou-lou-lau

On the weekend I take the bag to the launderette.

at-ban-dant

One day I left it with the attendant lady. She said I could pick it up in an hour.

Well I went for a pint in the pub. Then I went back to the launderette. As soon as I opened the door the lady was waving her hands and pointing to a load of rubbish. I soon realised that I had left the weekly rubbish bag by mistake.

Reader B's miscues show that s/he is reading for meaning. There are far fewer hesitations and clear attempts to word-build using grapho/phonic knowledge. S/he is becoming an effective reader.

I live in a flat and look after myself.

As my/clothes get dirty I put them in a black plastic bag which is delivered by the council for rubbish.

On the weekend I take the bag to the launderette.

One day I left it with the attendant lady. She said I could pick it up in an hour. White

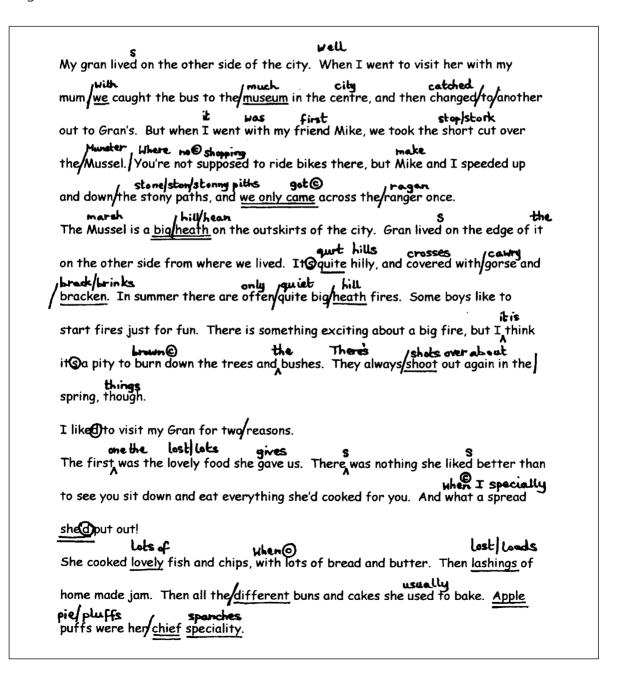
Well I went for a pint in the pub. Then I went back to the launderette. As soon putting lat as I opened the door the lady was waving her hands and pointing to a load of rubbish. I soon realised that I had left the weekly rubbish bag by mistake.

Reader C is mostly hesitating before tricky/long words, which shows s/he is having to employ some strategy to read the words correctly. This reader is not content to guess or omit the words, s/he is reading for meaning and is becoming an effective reader. The miscues do not detract from the meaning.

Miscue analysis

This piece of text, taken from *Pop's Shed* by Len Smith in the Rockets Series, was chosen by Martin, a 17-year-old learner, who said that because he lives with his grandmother, he was attracted to the opening words. The text is at Entry 3.

While the text should be sufficiently challenging to force some miscues, this piece of text was clearly quite difficult for the learner. However, as you will see in the following analysis, Martin understood much of the text. Therefore it is probably better for Martin to stay with text at this level, providing it is based on familiar themes. Otherwise, reading at Entry 2 might be used to build skills.



Miscue Analysis Form

Script	Miscue	Grapho/phonic	Semantic	Syntactic	Non response	Corrections
lived	lives	+	+	+		
when	well	✓	0	0		
we	with	✓	0	0		
museum	much	0	0	0		
centre	city	0	+	+		
changed	catched	✓	0	0		
1	it	✓	0	+		
with	was/when	✓	0	0		
friend	first	✓	0	0		
short	stop/stork	✓	0	0		
Mussel	Munster/marsh	✓	1	+		
you're	where	0	0	0		
not	no/not					1
supposed	shopping	+	0	0		
Mike	make	+	0	0		
stony	stone/ston/stonny	+	1	+		
paths	piths	+	0	0		
came	got/came					1
ranger	ragan	+	0	0		
heath	hill/hean	✓	1	+		
quite	qurt	✓	0	0		
hilly	hills	+	+	0		
covered	crosses	✓	0	+		
gorse	cawry	0	0	0		
bracken	brack/brinks	+	0	0		
often	only	1	0	+		
quite	quiet	+	0	+		

	nalysis Form neMartin				Entry 3		
Script	Miscue	Grapho-phonic	Semantic	Syntactic	Non response	Corrections	
it's	lit	+	+	0			
burn	brown/burn					1	
they	there's	1	0	0			
shoot	shots	+	+	0			
out	over	0	0	0			
again	about	0	0	0			
though	things	1	0	0			
liked	like	+	+	+			
lovely	lost/lots	1	1	0			
with	when/with					1	
gave	gives	+	+	+			
what	when					1	
spread	specially	✓	0	0			
with	when					1	
lashings	lost/loads	0	+	+			
used	usually	✓	1	0			
puffs	pie/pluffs	+	+	0			
speciality	spanches	✓	0	0			
No. of repetit	ions. 15		. No. of	insertions4			
No. of omissions							
 Reads word Reads in a Reads miss Reads with Reads stres Reads fluer Reads paus 	jerky way with little ing out lines or losi out regard for pun- sing every syllable ntly with hesitation	ng the place in the t ctuation only before difficult nd whole sentences	words	y y y y y n points	es /no es /no es/ no		

Strengths and weaknesses

Martin read with determination, tried every word in the text and made some self-corrections. He was aware of punctuation and understood the gist of the text. He used **visual strategies** as his main word recognition device. This is very evident from the way that many of the substitute words are close in length, share visual features and begin with the same letter, e.g. marsh for Mussel, make for Mike, shopping for supposed.

Martin does use meaning sometimes to help him because he has substituted some of his own words to make sense of the text e.g. I like(d) to visit my gran for two reasons. The first one the was the (lovely) lost/lots food she (gave) gives us.

However there are times when he has misread words and carried on regardless of the meaning e.g. **covered with gorse** becomes **crosses with cawry**.

Martin has insecure phoneme-grapheme correspondence and therefore does not use decoding strategies effectively for new words. His need to take in the whole word without close analysis of all its parts, leads him to leave off plurals and suffixes. The effect is to alter the grammar and to force him to alter subsequent words to accommodate his earlier changes.

It will be very important to work on text with Martin before trying to get him to read it as a whole. Getting him to identify tricky/key words by scanning the text beforehand and working on them – their features, meaning etc and discussing what the text may be about – should make his reading more fluent and his comprehension less compromised.

ILP information

Long-term goal

To read, with understanding and little hesitation, familiar and meaningful texts at Entry 3.

Short-term goals

Target:

Rt/E3.4 – To identify the main points and ideas and predict words from context

Target:

Rt/E3.7 – To scan texts to locate information (tricky/key words)

Target:

Rw/E3.5 – To use a variety of reading strategies to help decode an increasing range of unfamiliar words (with a particular emphasis on sound and letter patterns, syllables and suffixes)

Target:

Rw/E3.3 – To use a dictionary to find the meaning of unfamiliar words (record meaningful ones in a personal dictionary)

Examples of texts for miscue analysis

Entry 2

The Ride To Hell

By Iris Howden

(Livewire Chillers, published by Hodder and Stoughton, in association with the Basic Skills Agency

The bus was going fast.

It was hard to stand up.

I had to hold on to a rail.

The other people just stared ahead.

No-one moved.

They sat still as if made of stone.

Their faces were pale.

The skeleton moved from side to side.

It seemed to be coming closer.

I looked out of the window,

I did not know where we were.

I had never been to this part of town.

By now I was shaking with fear.

How could I be here?

On a bus full of dead people.

With no driver.

In a strange place.

With a skeleton coming closer?

The Yellow Wallpaper By Charlotte Perkins Gilman

(Livewire Classics, published by Hodder and Stoughton, in association with the Basic Skills Agency)

There is a lovely garden! I never saw such a garden! It is large and shady with paths and seats. There were greenhouses, but they are all broken now.

The place has been empty for years. There is something strange about it - I can feel it.

I even said so to John one moonlit evening, but he said what I felt was a draught, and shut the window.

He said I mustn't start imagining things, imagining things is bad for me. He says I need to control myself.

He is very careful and loving, and hardly lets me move by myself.

I don't like our room a bit. I wanted one downstairs that opened onto the patio, and had roses over the window. But John would not hear of it.

It is a big, airy room. Some of the paper has been pulled off – in great patches all around the head of my bed, about as far as I can reach, and in a great place on the other side of the room, low down.

I never saw a worse paper in my life. An ugly sprawling pattern, that gives you a headache to look at it.

The colour is repellent, almost revolting - a thick, dirty yellow, dull yet lurid in some places, sickly and faded in others.

The Thirty–Nine Steps

By John Buchan

(Oxford Bookworms Library)

His name was Franklin P. Scudder and he was an American, but he had been in south-east Europe for several years. By accident, he had discovered a group of people who were working secretly to push Europe towards a war. These people were clever, and dangerous. Some of them wanted to change the world through war; others simply wanted to make a lot of money, and there is always money to be made from a war. Their plan was to get Russia and Germany at war with each other.

'I want to stop them,' Scudder told me, 'and if I can stay alive for another month, I think I can.'

'I thought you were already dead,' I said.

'I'll tell you about that in a minute,' he answered. 'But first, do you know who Constantine Karolides is?'

'The Greek Prime Minister. I've just been reading about him in today's newspapers.'

'Right. He's the only man who can stop the war. He's intelligent, he's honest, and he knows what's going on — and so his enemies plan to kill him. I have discovered how. That was very dangerous for me, so I had to disappear. They can't kill Karolides in Greece because he has too many guards. But on the 15th of June he's coming to London for a big meeting, and his enemies plan to kill him here.'

The Ascent of Everest

By Sir John Hunt

(Hodder and Stoughton)

The rarefied air surrounding the upper part of Everest, or any other of the big peaks, obviously makes movement, even over easy ground, much more difficult. Lack of oxygen also slows down and blurs the mental processes. Beyond a certain point, life itself is no longer possible. On the other hand, it is now sufficiently proved that the ill-effects of altitude on the climber may at least be retarded by a careful regimen of what we call acclimatization, a gradual getting used to increased height over a certain period of time.

Individual performances on a mountain naturally vary but it may be said that those among us who are best adapted to climb high mountains, provided they follow this policy of gradualness, can reach an altitude of at least 21,000 feet and remain there without serious detriment — at any rate long enough to make a supreme final effort to reach a higher point, provided it is not too far above.

Trouble begins above that height (21,000 feet), which is one main reason why the really high peaks – those above 26,000 feet and over – are in a different category of difficulty from any lesser ones. The policy of gradualness breaks down, for the muscles begin to deteriorate fairly rapidly and the climber's resistance to cold, his fortitude in the face of wind and weather, are weakened. He tends to lose the promptings of appetite and thirst and he is denied the relaxation of normal sleep. In fact from about 21,000 feet onwards, he really needs to speed up the rate of his progress and employ 'rush' tactics. But this he cannot do. On the contrary, he is increasingly handicapped by the height as he climbs and his progress becomes painfully slow; the mental effort, like the physical, is infinitely greater.

Considering that Everest is over 29,000 feet and that some 8,000 feet have to be climbed above this established level of successful acclimatization, one aspect of our problem, which also played an important part in defeating former expeditions, becomes clear.



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