Toward a general theory of deception

Barton Whaley

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> Give me a good 'effect', and I'll find a way to do it.
> — David Devant, Magician

This paper gives a preliminary general theory of deception. It is pragmatic, presented as 1) a teaching tool for persons concerned with deception and counter-deception, either as practitioners or potential victims; and 2) an analytical tool or model for deception operations, specifically as a check-list to assure that all aspects have been covered, all bases touched, in the design, analysis, or detection of deception operations.

This is the first comprehensive attempt at deception theory.[1] Previous efforts, mainly classified, have been directed to specific military problems such as camouflage[2] or ECM/ECCM.[3] Even recent efforts toward special theories of military or diplomatic deception have progressed only to the stage of developing narrowly focussed and non-comprehensive maxims or hypotheses.[4] These represent, at best, proto-theory, as do some contributions from such diverse deception fields as illusions in nature, psychological misperception, and magic.

The theory is based primarily on comprehensive and systematic analyses of two major but quite separate fields in which deception predominates — war[5] and magic.[6] These fields were chosen as the first for comparative analysis because among all deceivers military deception planners and magicians have by far the most experience.

If truly general, such a theory must apply to all other fields of deceptive illusion as well. Therefore additional evidence was surveyed anecdotally for all other major occupational types that employ deception to an important degree: diplomats, counter-espionage officers, politicians, businessmen, con artists, charlatans, hoaxers, practical jokers, poker players, gambling cheats, football quarterbacks, fencers, actors, artists, mystery story writers, or you or I in our everyday lives.[7]

Even nature produces its share of deception — both physical illusions such as the mirage or the 'bent' stick in water and the perceptual illusions that have slowly evolved through genetic mutation, those kinds of hiding camouflage and/or showing lures of the zebra, the chameleon, and the anglerfish. Here too, the array of examples was surveyed.[8]

A Convergence of Traditions

All modern magicians recognize that magic is applied psychology. It is the only field where this is universally recognized to be so. However, a number of

experts have implied this in asserting analogies among ostensibly separate fields where deception plays a significant role.

That spiritualism was merely 'conjuring in disguise' was first detected in 1851, three years after its introduction, by magician John Henry Anderson. Writer Raymond Chandler (in 1948) noted an analogy between sleight-of-hand and plotting a mystery story; the Roman statesman-philosopher Seneca (c. 50 AD) one between magician's sleights and the art of rhetoric; magician-stage director Henning Nelms (1969) one between magic and theater; magician Henry Hay (1949) one between magic and jokes. Magician-camouflager Major Jasper Maskelyne (1949) one between magic and both camouflage in particular and military deception in general; neuropsychologist R. L. Gregory (1970) one between psychological illusion and the scientific method. British WWII military deception planner Dr R. V. Jones (1957) argued systematically for one among the scientific method, practical joking, and military deception. British military theorist Captain Basil Liddell Hart (1929) recognized an analogy between military deception and deception in sports and subsequently (1956) added deception in international politics at the level of 'grand strategy'. But, of course, Machiavelli had long since made the even closer general connection among deception in war, politics, and (implicitly in his one work of fiction) everyday life. Finally, bringing these full circle, Brigadier-General Eliahu Zeira (1975), former Israeli Director of Military Intelligence, perceived an intimate analogy between military deception planners and magicians.

I will go further and assert that deception is the same regardless of whatever field it appears in. It is not a function of technology. All deceptions are applied psychology — the psychology of misperception — and hence are connected by more than one or two analogous points. Consequently, along psychological lines it must be logically possible to develop a general theory of deception.
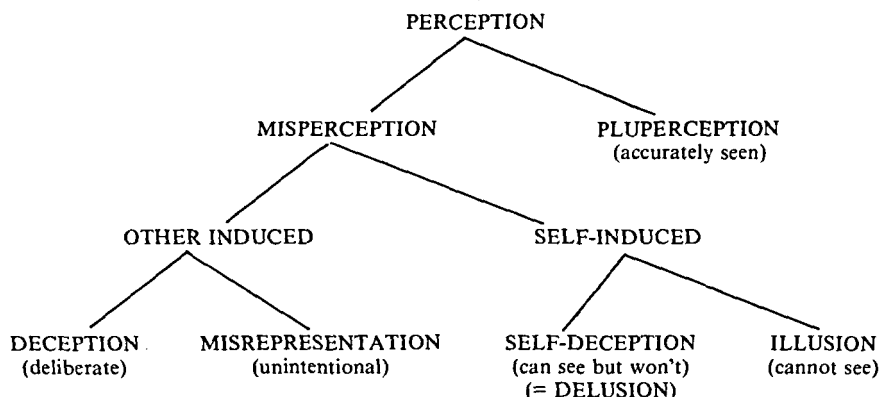
Toward Theory

Theories are only statements about how separate things, whether objects or events, relate to each other. Flashes of insight, so-called sixth sense, intuition, mere hunches, presumptions, assumptions, analogies, hypotheses, principles, theorems, propositions, natural laws, and even fully articulated theories are all basically the same, distinguishable only by the degree of logical and evidential rigor by which they are stated. (I speak only of empirical theory — theory based on verifiable evidence — and not of those non-empirical theories such as are often met in religion, mysticism, psychoanalysis, and elsewhere that are incapable of either proof or disproof and must remain forever a matter of pure faith.)

In any case, to build a theory of deception we must first have a taxonomy. A taxonomy is simply a formal statement or model of the various categories included in any system, mapping the structure of that system by its types. Hence it is also called a typology. So we begin with a typology of perception and move on to examine misperception, so-called self-deception, and deception.

Misperception: Deception and Self-Deception

Deception is one form or mode of perception. Specifically, it falls in that main division of perception called misperception. These terms and the manner in which they relate are summarized in the following diagram.

A TYPOLOGY OF PERCEPTION

PERCEPTION

MISPERCEPTION   PLUPERCEPTION
                                                                          (accurately seen)

OTHER INDUCED   SELF-INDUCED

DECEPTION   MISREPRESENTATION   SELF-DECEPTION   ILLUSION
(deliberate)   (unintentional)   (can see but won't)   (cannot see)
                                                                          (= DELUSION)

Source: Barton Whaley, *A Typology of Misperception* (draft, March, 1980), with thanks to Lewis
Reich, formerly with the MATHTECH Division of Mathematica, Inc.

Because deception is a matter of misperception, it is a psychological phenomenon. All deceptions occur inside the brain of the person (or animal) deceived.[9] They take place only in the proverbial 'eye of the beholder'; we are not deceived by others, we only deceive ourselves — the 'deceiver' only intending and attempting to *induce* deception. He contrives and projects a false picture of reality; but to be deceived we must both perceive this attempted portrayal and accept it in more-or-less the terms intended and projected.

To avoid the consequent semantic bind that has bewildered many researchers when they confuse deception with self-deception and conclude that it is all 'self-deception', we will distinguish the former as other-induced deception and the latter as self-induced deception. We sometimes call such self-induced deception delusion; but, in any case, whether other-induced or self-induced, the cognitive process is, if not identical, quite similar.

Perceptions can most usefully be defined as hypotheses. The pioneering work leading to this view was published in 1867 by the influential German physicist and physiologist Hermann von Helmholtz. However his specific insight on perception as a 'conclusion' (hypothesis) based on 'unconscious

inference' was overlooked during the next hundred years by his fellow scientists who concentrated instead on uncovering the intermediating biological mechanisms that feed sensory data to the brain. These scientists have given us a wealth of understanding of how and with what specific distortions information reaches the brain, but they have remained bogged down in Immanuel Kant's 1781 theory of perceptions as 'intuition' (*Anschauung*). Now this is convenient shorthand for explaining how we perceive, but it is useless for explaining how we misperceive. This is why Gestalt psychology, wedded to both Kantian intuitionism and the now totally discredited 'isomorphic' or 'brain-trace' theory of physiology, seemed so promising but has proved such a disappointment in helping us understand how we misperceive.[10]

Then, in 1970, British neuropsychologist R. L. Gregory, picking up on Helmholtz's century-old lead, first proposed that 'perceptions are hypotheses'.[11] Professor Gregory combined evidence from physiology, neurology, and the philosophy of science to conclude that sensory inputs simply provide 'data for hypotheses' about the environment; the selected hypotheses being what psychologists and Everyman alike have been more-or-less loosely calling 'perceptions'.

The process of perception (including misperception) is crudely as follows: 1) The environment continuously transmits a chaotic cascade or spectrum of discrete data (the 'information bits' of communications theorists). 2) Our sensors (intrinsic such as eye and ear as well as extrinsic such as seeing-eye dogs or radar sets) detect certain portions of some of these spectra. 3) These bits and scraps of received data are transmitted (with slight delay but often considerable distortion) to the brain. 4) The brain discards most of these data but processes some immediately and stores it in memory. 5) The brain then develops hypotheses about the environment by drawing inferences from new as well as stored data.[12]

It would seem that everything we call 'thinking' is the cognitive process of testing hypotheses about incoming and stored data. This is true of all human brains, from the highest IQ to the lowest, from the most rational or logical to the most deranged and intuitional, from the child to the adult.[13] It has also been demonstrated for certain bigger-brained animals and seemingly applies even to the reflexes (responses to perceptions) found in the primitive nerve systems of brainless creatures. Similarly, 'learning' is the accumulation of more and more interrelated hypotheses.

Leaving the Helmholtz-Gregory theory aside, we must define the process whereby hypotheses are generated. They are built entirely by a process of comparison. At the simplest level, the individual, discrete information bits (raw data) are distinguished as *categories* (Plato's 'ideal types'), that is, hypotheses about their sameness or difference. These hypotheses are stored in memory. At the next higher level of aggregation sets of related bits combine into characteristics ('charcs' for short),[14] which are hypotheses about the interrelatedness of categories. These too are remembered. New bits of data are then compared with these hypothetical charcs and incorporated if perceived as congruent or discarded if incongruent. At the highest level of aggregation,

charcs combine into *patterns,* which are hypotheses about the interrelatedness of charcs. Again, these are remembered; and newly perceived charcs will be compared with the old pattern and either incorporated if congruent or rejected if incongruent.

More than one hypothesis can, of course, be erected upon any given set of sensory inputs. This is a logical requirement of scientific hypothesis building in general, but each specific builder (brain) has its own bias. While it would be useful to know more about such biases, considerable recent work has shown some of the different types of memory and styles of thinking[15] including cultural biases.[16] Nonetheless these are only the trees in the forest of theory, necessary for fine-tuning any deception plan or operation but not essential for understanding the overall theory.

Turning from perception to misperception, Gregory concludes that 'illusions are failed hypotheses' and suggests that they occur whenever either 1) our physiological perceptual input mechanisms malfunction, or 2) our cognitive hypothesis-generating strategies are inappropriate. The first circumstance accounts for all physiological illusions, the second for all psychological ones.

Gregory's is an elegant theory because it cuts through the previous turgid or inchoate speculations of psychologists.[17] Nor need we sit and wait until physiologists and neurologists discover all the physical mechanisms of perception.[18] Gregory's theory says in effect that while these other theories may tell us how we *receive* information, they are irrelevant for explaining how we *process* it.

The Structure of Deception[19]

The taxonomic structure and operational process of misperception applies equally to all four of its sub-types (p. 181) but we will now focus in on only one — deception.

In this section, each term will be defined both descriptively by its role in the structure of deception as well as operationally by its role in the process. Each term will also be compared with its standard usage by both magicians and soldiers.

Deception is the distortion of perceived reality. Operationally, it is done by changing the pattern of distinguishing characteristics (charcs) of the thing (whether object or event) detected by the sensory system of the target. The task (purpose) of deception is to profess the false in the face of the real.

* ⋆ Magicians call this generally 'magic' or occasionally and privately 'deception' and specifically a 'trick' or 'illusion'.
* ⋆ Soldiers and practitioners of intelligence call it 'deception'. Some military camouflagers call it 'strategic camouflage'.

Reality is distorted, deceptively portrayed, by both nature and man. Nature's deceptions are either without purpose (as with such familiar physical illusions as a mirage or the apparently 'bent' stick in water) or purposeful and, then, always to the advantage of the species involved (as with all evolutionary

bits of camouflage that have survival value).[20] Man's deceptions are also either without purpose (unintentional misrepresentations) or purposeful — with intent to deceive. Nature does this unconsciously; man does it either unconsciously (as with self-deception and some deceptions of others) or consciously and, then, always to some perceived advantage.

Every deception operation, whether of man or nature, is comprised of only two basic parts: dissimulation and simulation.[21] *Dissimulation* is hiding the real. It is covert, that part of a deception concealed from the target. Its task is to conceal or at least obscure the truth. Operationally, dissimulation is done by hiding one or more of the characteristics that make up the distinctive pattern of a real thing.

* Magicians speak of the 'method', the means or procedure by which a trick is done, the part that must be hidden from the audience. Some also use the word 'dissimulation' itself.
* Military deception specialists call this variously 'cover', 'cover and concealment', or simply 'dissimulation', defining the latter as 'hiding the real'. Practitioners of intelligencers speak of 'cover' and 'covert'; and some camouflagers call it 'negative camouflage'.

Simulation is showing the false. It is overt, that part of a deception presented to the target. Its task is to pretend, portray, profess an intended lie. Simulation is done by showing one or more characteristics that comprise the distinctive pattern of a false thing.

* Magicians speak of the 'effect' and define it as that part of a trick the audience is meant to perceive. Many also use the word 'simulation'.
* Some military deception experts also call this 'simulation' and define it explicitly as 'portraying the false'. Some camouflagers call it 'positive camouflage'. The term 'notional', meaning the false thing shown, was coined in its military sense around 1941 by Brigadier Dudley Clarke, the head of British World War II deception planning in the Middle East.

Both simulation and dissimulation are always present together in any single act of deception. Nothing is ever 'just' hidden; something is always shown in its stead, even if only implicitly — the housewife who hides her money in the cookie jar is pretending (showing) she has no money at home. It is the two in combination that misdirect the attention and interest of the target, inducing it to form misperceptions (false hypotheses) about the real nature of what is impending.

Basically there are only three ways to dissimulate and only three to simulate. The three procedures by which real things (objects or events) are hidden are masking, repackaging, or dazzling:

Masking hides the real by making it invisible. It either interposes a screen, shielding it from the senses (and any intermediating sensors) of the deceivee so it is truly covert, or integrates it with its environment so it is unnoticed, blending into its background, literally overlooked, hiding in plain sight. Operationally, masking is done either by concealing all distinctive

characteristics (at least those thought to be available to the target's sensors) or by matching them to surrounding characteristics. This is done in order either to conceal or blend its original pattern.

* The magician shields by hiding his gimmicks out of sight — backstage, behind mirrors, under the table, or in his hand. He integrates the Fake Finger by blending it in among the five real fingers of his hand. He also blends by 'black art'. Biologists call this 'crypsis', meaning concealment or camouflage.
* The soldier shields with smokescreens or electronic jamming; he blends into jungle or desert with mottled camouflage. German aircrews hid in captured American B-17s in 1944 to spy close-up on US bomber formations. And statesmen often feign diplomatic normalcy to mask their intent to go to war, as with Japan vs. the US in 1941 or Russia vs. Japan in 1945, Czechoslovakia in 1968, and Afghanistan in 1979.

Repackaging hides the real by disguising. It wraps a thing differently, modifying its appearance. It is simulated metamorphosis. Repackaging is done by adding or subtracting characteristics to transform them into a new pattern that resembles something else.

* Magicians repackage when they exchange costumes with an assistant in various 'substitution' illusions.
* A general may have a new unit in the line wear the distinguishing patches of the old to disguise the changeover. An admiral disguises a warship as a harmless freighter. General Dayan repackaged the opening stroke of the 1956 Sinai Campaign by publicly calling the seizure of the Mitla Pass a mere 'reprisal' to delay an all-out Egyptian counter-attack.

Dazzling hides the real by confusing. It bewilders, confounds, baffles, perplexes, reducing certainty about the real nature of a thing. Dazzling is done by randomizing or otherwise partially obscuring the characteristics of an object (its precise location, size, color, etc.) or an event (its exact timing, method of operation, etc.) in order to blur their distinctive pattern. Ideally, this modified pattern carries less conviction, conveys less certainty, than the real but underlying one.

* Magicians bewilder their audiences when they use the 'equivoque' to 'force' an object.
* The Royal Navy used zig-zag 'dazzle painting' on its warships in WWI to confuse German U-boat commanders; and General Bradley had his radio net simulate Patton's Third Army five times over to confuse the Germans about Patton' crucial move to relieve the Battle of the Bulge in 1944. All military codes and ciphers are a type of dazzle, jumbled mathematically so that they remain unreadable, although fully recognizable as encrypted messages.

Conversely, the three procedures by which false things are shown are

mimicking, inventing, or decoying:

Mimicking shows the false by having one thing imitate another. It duplicates a sufficient number of aspects of the other to give a passable replica. The ideal example is the double (*döppelganger*). Operationally, mimicking is done by copying one or more of the distinctive characteristics of the thing to be imitated to approximate its distinctive pattern.

* ★ The magician thus uses only the 'talk', the characteristic clinking sound of coins or the snapping of cards, to simulate the presence of the entire object; or, at the other extreme, introduces a double in the form of an identical twin to enhance a 'vanish'. Biologists specifically call this 'mimicry'.
* ★ General Otto von Emmich attacked the great Belgian fortress of Liège in 1914 with six brigades totalling only 20,000 troops; but, because this was a mixed force drawn from five corps, Belgian intelligence concluded from prisoners taken that they faced all five corps, an overwhelming force of 150,000 and accordingly withdrew their infantry screen. A more charc-filled ruse was that involving the British Army actor who played 'Monty's Double' in 1944.

Inventing shows the false by displaying another reality. Unlike mimicking which imitates an existing thing, inventing creates something entirely new, albeit false. Inventing is done by creating one or more new characteristics to create an entirely new pattern.

* ★ Magicians create dummy objects for certain 'substitution' effects such as forged billets in mind-reading acts or a complete dummy magician in Maskelyne's Levitation Extraordinary.
* ★ Generals create rubber tanks, wooden guns, canvas aircraft, and dummy radio traffic; admirals create dummy warships. Major Frederick Funston dressed his Philippino troops in Moro costume to capture their leader, Aguinaldo, in 1901.

Decoying shows the false by diverting attention. It offers a distracting, misleading option and is therefore a matter of feints and diversions, literally misdirection. Decoying is done by creating alternative false characteristics that give an additional, second pattern. Ideally this alternative pattern carries more conviction, conveys more certainty, than the real one.

* ★ For the magician, this is 'misdirection' in its most literal sense. Thus decoying occurs during every sleight-of-hand 'pass', as in the French Drop where an empty fist moves away from the other hand as if it had just taken an object from it.
* ★ And generals, like football quarterbacks, fake left and run right. By creating a successful diversion on one flank, at one point, or from one direction while attacking another, Sherman took Atlanta in 1864, Allenby took Palestine in 1918, the US Marines took Tinian in 1944, and MacArthur took Inchon in 1950.

Also, just as the two overriding categories of dissimulation and simulation

are opposites, their separate sub-categories also stand opposing one another as mirror-image antonyms — shown schematically as follows:

DISSIMULATING	1. masking 2. repackaging 3. dazzling	mimicking 1. inventing 2. decoying 3.	SIMULATING

Therefore, masking has its counterpart in mimicking, repackaging in inventing, and dazzling in decoying. Although this schema is logically elegant, it is an artifact, a logical consequence of the fact that the basic categories of *dissimulation and simulation are already defined as opposites. In practice as in theory, all three ways of hiding the real can accompany the three ways of showing the false in any of their possible combinations.

Because both dissimulation and simulation are always present together in any single deception operation, we can take the pair of separate but parallel three-fold parts of the taxonomy and create a 3×3 matrix that will encompass all acts of deception. Thus the following table, which draws its examples from magic tricks.

THE STRUCTURE OF DECEPTION
(with process defined)

DECEPTION (Distorting Reality)	
DISSIMULATION (Hiding The Real)	**SIMULATION** (Showing The False)
MASKING Conceals One's Own } Charcs Matches Another's (to eliminate an old pattern or blend it with a background pattern).	MIMICKING Copies Another's Charcs (to recreate an old pattern, imitating it).
REPACKAGING Adds New } Charcs Subtracts Old (to modify an old pattern by matching another).	INVENTING Creates New Charcs (to create a new pattern).
DAZZLING Obscures Old } Charcs Adds Alternative (to blur an old pattern, reducing its certainty).	DECOYING Creates Alternative Charcs (to give an additional, alternative pattern, increasing its certainty).

This matrix seems to provide a close fit for the multitude of magical tricks. Should all such effects and methods fit, then it is truly a special structural or taxonomic model of magic. If they fit with ease and without ambiguity, it is a useful model as well. If much torturing is required to make the example fit the matrix, then the model is an intellectual Procrustean Bed of limited value. But even if only *most* tricks fit easily, the model is still perhaps worthy of further development.

Observe in the matrix that the three ways of dissimulation and the three of simulation are each arrayed in ostensibly descending order of effectiveness. Bell's assumption (hypothesis) was that masking would be the most effective way to dissimulate. Therefore, if *masking* fails to confer sufficient invisibility to the real object or event and it is noticed, the deceiver can then resort to *repackaging* to disguise it. And if repackaging fails and the thing is recognized for what it is, then *dazzling* can be used as a last-ditch measure at least to confuse the target about some characteristics. Conversely, Bell assumed that mimicking would be the most effective way to simulate. Therefore, should *mimicking* fail to show the false by a convincing imitation, the deceiver can resort to *inventing* to create an alternative reality. And if inventing also fails, *decoying* can still be used at least to attract the otherwise undivided attention of the target away from it.

Consequently, it seemed to me that, in theory, the most effective deceptions will dissimulate by *masking* and simultaneously simulate by *mimicking,* while the potentially least effective would be those that combine *dazzling* with *decoying* to achieve only a mere razzle-dazzle effect. Therefore, while dazzling-decoying deceptions might get invented, few if any would survive frequent operational experience and consequently would get dropped from repertory.

To test Bell's hypothesis and my subsidiary one, I chose to use the tricks of magicians, because among all professional deceivers, they have by far the most frequent experience of both failed and successful deceptions. Generals, like card cheats, would be more likely simply to *prefer* certain types of deception without having much hard evidence of their effectiveness. Accordingly, all magic tricks that had been collected to illustrate a previous paper were fitted to the matrix. As can be seen in practice or at least in magician's practice, both hypotheses were substantially verified.[22] Masking and mimicking are not only overwhelmingly the most common methods used for dissimulation and simulation respectively; but also they are the two used most often in combination. Conversely, only one example of dazzling-decoying was discovered (the 'Thought Force'), despite an even wider search among the repertory of magic.[23] Thus, this is an apparently useful procedural model or guide for the planner to follow in designing the most effective deceptions.

Magical tricks are the magician's deception operations. If this model can be as effectively applied to deception outside the special field of magic, it then takes on the character of a general theory. In fact, as noted above, work to this end has already been done not only somewhat systematically on military deception but, albeit with less rigor, also on the other major fields that employ it.

THE MATRIX OF DECEPTION
(as applied to 60 magic tricks)

SIMULATING

DISSIMULATING	Mimicking	Inventing	Decoying
Masking	19	10	10
Repackaging	4	3	1
Dazzling	10	2	1

Source: Whaley (1981), table, based on an opportunity sample of 60 tricks.

The Process of Deception[24]

The deception process is implicit in the preceding section, which gave operational definitions of all relevant terms. Here this process is made explicit. Its ten steps are:[25]

First, in planning a deception, the planner must know its *strategic goal.* For the magician, this is always 'simply' to provide the audience with a pleasing and surprising effect or puzzle, for that is all they expect if he is to earn his keep. For the military commander it may be to launch a surprise invasion of another country, effect a landing on an enemy beach with minimum initial opposition, get the jump on the enemy with a new attack or counter-attack, or simply get a reconnaissance or rescue party in and out of hostile territory with sufficiently low casualties to assure success. These goals pose the kinds of problems the planner initially faces; they are the 'givens' he must work within.

Second, the planner must decide how he wants his target to *react* in such a given situation. The magician requires only that his audience concentrate their attention and interest on the portrayed effect to the exclusion of the secret method. For the military deception planner, however, the problem is more subtle, as best put by Britain's most experienced WWII deception planner, Brigadier Dudley Clarke, head of the so-called 'A' Force deception planning team in Cairo:[26]

> In the first Deception Plan I ever tackled I learned a lesson of inestimable value. The scene was Abyssinia ... Gen. Wavell wanted the Italians to think he was about to attack them from the south in order to draw off forces from those opposing him on the northern flank.
> The Deception went well enough — but the result was just the opposite of what Wavell wanted. The Italians drew back in the South, and sent what they could spare from there to reinforce the North, which was of course the true British objective.
> After that it became a creed in 'A' Force to ask a General 'What do you want the enemy to *do*?', and never 'What do you want him to *think*?'.

Third, only then must the planner by himself — whether general or magician — decide what he wants the target to think about the facts or event, precisely what it is they should *perceive.*

Fourth, he must decide specifically what is to be *hidden* about those facts or

impending events and what is to be *shown* in their stead. In doing this he should remember the caveat that hiding and showing ideally take place simultaneously, as any deviation from simultaneity gives the target more time to discover the switch. (In military practice hiding usually takes place prior to showing, only sometimes simultaneously, and fortunately because most riskily rarely afterwards.)

Fifth, the planner now analyzes the *pattern* of the real thing to be hidden so as to identify its distinguishing characteristics ('charcs'), specifically which of these charcs must be deleted or added to give another pattern that suitably *masks, repackages,* or *dazzles.*

Sixth, he does the same for the false thing to be shown to give another pattern that plausibly *mimicks, invents,* or *decoys.*

Seventh, at this point the planner has designed a desired *effect* together with its hidden *method.* He must now explore the means available for presenting this effect to the target. The magician may be limited by the type of apparatus he has at hand, his ability to purchase or construct appropriate new apparatus, or his theatrical ability. Military commanders or practitioners of intelligence may be limited by their available deception assets and will often have too little time to acquire additional ones. They must make do or go back to Stage Four planning and try for an alternative design.

Eighth, having the effect and the means, the planning phase has ended and the operational phase begins. In magic, the planner is usually also the performer. In the military and intelligence fields, the deception planner usually hands over to operational units to present ('sell') the *effect.*

Ninth, the *channels* through which the false charcs (and patterns) are communicated must be ones open (directly or indirectly) to the target's sensors. A magician should not use a 'false count' of clicking coins before a deaf spectator. An intelligence officer should not plant disinformation in a newspaper unless he has reason to believe the enemy monitors that paper.

Tenth, and last, for the deception to succeed, the target must accept ('buy') the *effect,* perceiving it as an *illusion.* Deception will fail at this point only if the target takes no notice of the presented effect, notices but judges it irrelevant, misconstrues its intended meaning, or detects its *method.* Conversely, the target will:

* take notice, if the effect is designed to attract his *attention*;
* find it relevant, if the effect can hold his *interest*;
* form the intended hypothesis about its meaning, if the projected pattern of charcs is *congruent* with patterns already part of his experience and memory; and
* fail to detect the deception, if none of the ever-present charcs that are *incongruent* are accessible to his sensors.

Effective deception planning must anticipate all four of these contingencies. And a wise deceiver will seek feedback, monitoring the target's responses, to assure that these four contingencies are being met.

Counter-deception

Counter-deception[27] is the detection of deception. As just implied (point 10, above) its own special theory flows smoothly from the general theory of deception.

Several experts have argued that surprise is inevitable, particularly if deception is employed to gain it.[28] While acknowledging the grave difficulties that the intelligence analyst (particularly the counter-deception analyst) faces, I would argue that counter-deception, like deception, is in theory possible — always.

The possibility of detecting deception, any deception, is inherent in the effort to deceive. Every deception operation necessarily, inevitably, leaves clues. The analyst requires only the appropriate sensors and cognitive hypotheses to detect and understand the meaning of these clues. The problem is entirely one of technology and procedures and never one of theory.

Because everything (whether objects or events) can to some extent be both simulated and dissimulated, deception is always possible. However, because this can *never* be done to the *full* extent, counter-deception is also always possible. In other words, incongruent characteristics (clues) inevitably are present in every deception operation. These incongruent charcs form alternative patterns (hypotheses) that themselves are incongruent (discrepant, anomalous, paradoxical) with reality. As there are no paradoxes, no ambiguities, no incongruencies in nature, to detect incongruency is to detect the false.

Conclusion

In sum, everything that exists can to some extent be both simulated and dissimulated. Therefore deception is always possible; any thing and any event is meat for the deception planner. The planner — whether magician, general, or anyone else — can take courage from magician David Devant's motto: 'Give me a good "effect" and I'll find a way to do it.' And his is no idle claim, as proven time and time again by Devant and other magician-innovators faced with this challenge to deceive.

Finally, although we now have a preliminary theory of deception, we might also wish a theory of counter-deception — the detection of deception. Here too a study of magic can be helpful because magicians — master deceivers themselves — have proven themselves the best detectives of the deceptions of three of the main types of deceivers: psychic frauds, gambling cheats, and other magicians. But that is another story, a promising one because while anything can be either simulated or dissimulated to some extent, it can *never* be done so to the *full* extent. Therefore counter-deception, like deception, is in theory always possible.

NOTES

1. This paper is an elaboration and refinement of work begun in 1979 by J. Bowyer Bell and Barton Whaley. See Bell and Whaley (1979) and Bell and Whaley (1982).

2. For example, Solomon J. Solomon, *Strategic Camouflage* (London: Murray, 1920), the pioneering work on camouflage theory.

3. Beginning in World War II with Dr R. V. Jones' 1942 paper on 'The Theory of Spoof'.

4. Donald C. Daniel and Katherine L. Herbig, 'Propositions on Military Deception', in Daniel and Herbig (eds.), *Multidisciplinary Perspective on Strategic Deception* (Monterey: US Naval Postgraduate School, 1980), 5–44.
   L. Daniel Maxim, Mary C. Walsh, Carl Leaver, and Barton Whaley, 'Deception Maxims' (Washington, D.C.: Mathematica, Inc., and ARM/ORD/CIA, 1980); and Robert Jervis, *Perception and Misperception in International Politics* (Princeton: Princeton University Press, 1976).

5. Barton Whaley, *Stratagem: Deception and Surprise in War* (Cambridge, Mass.: Center for International Studies, MIT, 1969) which, with updates, surveyed 232 battles from 1914 to 1973.

6. Barton Whaley, *The Special Theory of Magic: Conjurers as Deception Planners* (draft 1981), which surveyed 60 magic tricks.

7. J. Bowyer Bell and Barton Whaley (under psudonym of 'J. Bartos Bowyer'), *Cheating* (New York: St. Martin's Press, forthcoming, spring 1982), surveying several examples from each of these fields for a total of about 200.

8. H. E. Hinton, 'Natural Deception', in R. L. Gregory and E. H. Gombrich (eds.), *Illusion in Nature and Art* (New York: Scribner's, 1973), 97–160.

9. Colin Blakemore, 'The Baffled Brain', in Gregory and Gombrich (1973), 9–47. See also John P. Frisby, *Seeing: Illusion, Brain and Mind* (New York: Oxford University Press, 1980).

10. Gregory (1973), 51–3.

11. See Gregory (1973), 53–69, 74–90. See also Frisby (1980), 156. Professor Frisby, a perceptual psychologist, reaches a similar conclusion in speaking of 'descriptions inside our heads' or 'object recognition' arrived at by 'computational strategies'.

12. Gregory (1973), 51, 55.

13. Peter Bryant, *Perception and Understanding in Young Children: An Experimental Approach* (New York: Basic Books, 1974).

14. To use a convenient term coined by Dr J. Bowyer Bell in 1980.

15. Particularly relevant is: Karl E. Schiebe, 'The Psychologist's Advantage and Its Nullification', *American Psychologist*, October 1978, 869–81. See also his *Mirrors, Masks, Lies, and Secrets.*

16. Jan B. Deregowski, 'Illusion and Culture', in Gregory and Gombrich (1973), 161–91. The thin literature on cultural style in military deception is summarized in Daniel and Herbig (1980), 16–17.

17. Neatly summarized in Richards J. Heuer, 'Cognitive Factors in Deception and Counter-deception', in Daniel and Herbig (1980), 45–101.

18. This work is summarized in Colin Blakemore, 'The Baffled Brain', in Gregory and Gombrich (1973), 9–47.

19. This section is a refined and elaborated account of the material in Bell and Whaley (1982), Ch. 2, which in turn was based on the authors' draft paper, 'A Taxonomy of Deception', written in 1979 for Mathematica, Inc. This taxonomy was primarily the work of Dr Bell.

20. H. E. Hinton, 'Natural Deception', in Gregory and Gombrich (1973), 97–159.

21. While the systematic analysis of these two terms as a dichotomy goes back at least as early as the early 17th century essay 'On Simulation and Dissimulation' by Sir Francis Bacon, its first application to military theory (and using these two words) was made by the painter who became head of British camouflage in the Great War, Solomon J. Solomon, in his pioneering book, *Strategic Camouflage* (London: Murray, 1920).

22. Although this sample was not a random selection (much less a 'universe') of tricks, the *relative* values in the separate cells of the table probably hold, the bias having been to search out more diligently the rarer categories.

23. Indeed, the only example found in any other field of deception is the old carnival game called, appropriately, Razzle-Dazzle in which the 'flat-joint' operator false-counts the sucker's score to make him a loser. See Scarne (1974), 582–9.

24. This section is a simplified summary of the model of deception planning given in Bell and Whaley (1982), Ch. 2. The preliminary version was a draft paper, 'A Deception Planning Model', done in 1979 for Mathematica, Inc.

25. An alternative but not contradictory process model is given by Daniel and Herbig (1980), 8–14.

26. Brigadier Dudley Clarke, 'Some Personal Reflections on the Practice of Deception in the Mediterranean Theatre from 1941 to 1945' (memo dated 6 Sept. 1972), as reproduced in Mure (1980), 274. See also Mure (1980), 9, 81–2; and Daniel and Herbig (1980), 4.

27. This now standard term was coined in 1968 by Dr William R. Harris.

28. Notably Roberta Wohlstetter, *Pearl Harbor: Warning and Decision* (Stanford: Stanford University Press, 1962); and Michael Handel, 'Perception, Deception and Surprise: The Case of the Yom Kippur War', *Jerusalem Papers on Peace Problems,* No. 19 (Jerusalem: The Hebrew University, 1976).