MANAGERIAL PRACTICE AND FINANCIAL SUCCESS IN EXTENSIVE CATTLE RANCHING[1]

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Abstract

Grazing management, breeding practice, marketing behaviour and financial management all form part of the extensive cattle rancher's system. Many ranching areas are characterised by large climatological variation, which in its turn leads to variable availabilites of edible plants. Beef prices are subject to cyclical and seasonal variation. Market access is limited by the permit/quota system. Market planning and adaptability that will enable farmers to adjust stock numbers to both marketing strategy and ecological conditions is a key to financial success. Farmers should limit capital expenditure; this includes limitations in number of camps and number of herds. Larger camps, fewer herds and multisire mating appear to be associated with financial success.

Uittreksel

Weidingsbestuur, teelpraktyk, bemarkingsoptrede en finansiële bestuur vorm alles deel van die ekstensiewe beesboer se bestuursisteem. Baie beesweistreke word gekenmerk deur groot klimatologiese veranderlikheid wat weer lei tot veranderlike beskikbaarhede van eetbare plante. Beesvleispryse is onderworpe aan sikliese en seisoenskommelings. Die permit/kwotasisteem beperk toegang tot marke. Bemarkingsbeplanning en aanpasbaarheid wat boere in staat sal stel om veegetalle by beide bemarkingstrategie en ekologiese toestande aan te pas is 'n sleutel tot finansiële sukses. Boere moet ook kapitaalbesteding beperk; dit behels beperking op getalle kampe en kuddes. Groter kampe, minder kuddes en multibul paring blyk met finansiële sukses geassosieerd te wees.

1. Introduction

Beef ranching as production process involves the use of financial assets and natural resources in the production of saleable cattle. The natural environment in most Southern African ranching regions is unstable and has moreover been classified as brittle. The difference between brittle and non-brittle environments results from the "total climate" - the annual pattern and volume of precipitation, winds, daily temperatures and their relationship to precipitation. A brittle environment is more unstable in terms of growing season of vegetation, the process of decay, the form of botanical succession, rest and plant spacing (Savory, 1988). Mismanagement of natural resources in brittle environments can have severe consequences - "vegetation changes according to the way it is treated" (Acocks, 1975). The intervention of man has rendered the environment more susceptible to rapid change, and has been the fundamental cause of its deterioration which has in large parts of Southern Africa involved erosion and desertification (Rosini, 1981; Phillips, 1938; Jacks & Whyte, 1944; Kokot, 1948; Tyson, 1981; Berry, 1986). This process can be halted only by adopting farming systems which are well adapted to the environment.

Rainfall appears to have a cyclical nature. In 1857, Livingstone suggested a 10 to 12 year cycle and Wilson (1865) described "revolutions of the weather in cycles of years". Other early researchers who reported on weather cycles included Passarge (1904), and Von Gernet (1914). In an analysis involving data from 157 stations over the period 1910-1972, Tyson *et al* (1975) found a cyclical pattern of approximately 9 wet, and 9 dry years in an oscillation of about 18 years. This does not render rainfall forecasteable with any acceptable degree of precision; dry years do occur within a 9 year period of wet years, and vice versa. Dry years within the "wet" period are more common than the other way around. Dry spells have been more persistently dry than the wet spells have been wet (Lindesay, 1984; Tyson, 1986).

Beef ranching is subject to economic as well as climatic variability. South African agriculture has for a considerable period been subject to a cost-price squeeze (Groenewald, 1982, 1985; Liebenberg & Groenewald, 1990). Neither have prices for slaughter stock and beef been stable. Meat prices have for long exhibited cyclical as well as seasonal fluctuations. Cycles are normally of a length of approximately 7 years. The upward phase of cycles is relatively short - approximately 2 years - and the downward phase is accompanied by stock liquidation. Beef cycles are relatively stable and partially self generating, depending on price expectations, supply cycles and rainfall cycles (Lubbe, 1990). These cycles have been traced back to the 19th century (Tomlinson, 1938). On a seasonal basis, prices reach a maximum in January, decline thereafter until winter, and reach low levels from April to August. Prices rise from September through January. The higher grade/lower grade price ratio is larger during the downward than the upward phase (Lubbe, 1989). Unexpected events can create deviations from the cyclical and seasonal patterns.

Control over access to the metropolitan markets by means of marketing permits or quotas
has added constraints to beef ranchers' managerial latitude and has also indirectly contributed to veld degradation. Besides unfavourable the effects of this on the meat industry (Nieuwoudt, 1975), it has created a perception among ranchers that the system favoured feedlots, big farmers and middlemen (including speculators) and discriminated against ranchers, small farmers and farmers in outlying areas (Elliott *et al*, 1987).

Whether new and forthcoming changes in the meat marketing will change this materially, remains to be seen in the future.

It is within the variable natural and economic environment that the beef rancher has to define his managerial goals and priorities and manage his resources. In this paper, it will be assumed that his goal will be maximization of long-run benefits. This entails maximization of short-run or medium term - economic benefits, taking the length of weather and price cycles into consideration. This, however is constrained by the overriding goal of long-run financial benefit which in a brittle environment includes maintenance or improvement of natural resources. This definition automatically implies convergence between own interest and social responsibility.

2. Research approach

The goal with this research was to evaluate certain managerial practices in terms of profitability in beef ranching. The first step was selection of a criterion of success. It was decided to use ROAM (Returns on assets managed) as criterium, subject to the regulation of animal units in terms of a biologically responsible model or procedure. The principle of this ratio is that it focuses on asset productivity, which may be regarded as a true measurement of operating competence (Blackenberg, 1981).

The two basic components of ROAM are:

ROAM	ATO (asset turnover)	)Asset management
	ROS (return on sales)	)Margin and Revenue)Management

These entities are calculated as follows:

$$ATO = \frac{SALES}{ASSETS}$$

EBIT (Earnings before interest and tax) = ROS x ATO
ROAM = EBIT x ATO
ROAM is normally expressed as a percentage.

The RAOM parameter can be applied at various stages of financial analysis. The above illustration describes an EBIT-ROAM. An AIBT (after interest before tax) or ATROAM (after tax ROAM) can also be calculated after interest and/or tax has been deducted, leaving net profit. The asset base (assets) in the ROAM calculation varies from farm to farm, and includes: (a) fixed assets (depreciated value), (b) capital expenditure, (c) cash resources and (d) stock (mainly livestock at commercial values) on hand. The important principle is consistency with inclusion (a-d) for accurate yearly comparisons.

The evaluation of managerial practices was done by an extensive literature survey on climato- biological and financial principles of range management, and translating these into managerial practices. An effort was also made to test practices vis-a-vis financial success. A small sample of farmers in the Northern cape was used for the latter purpose. The sample cannot be regarded as, and was not designed to be representative of a wide spectrum of beef ranchers. Only farmers who had been perceived to be successful, ie perceived to fare considerably better than the average, were included. These farmers were selected in cooperation with extension officers in Vryburg and farmers' association chairmen. The choice was restricted to farmers on three of the nine veld types in the Northern Cape as identified by Mostert *et al* (1971) and Fourie (1983). Twenty farmers were eventually visited. The survey was conducted in two phases. In the first, respondents were asked questions pertaining to their practices and perceptions involving physical phenomena, grazing, breeding, marketing and farm management. This was later followed by a financial survey involving two production years (1984/85 and 1985/86). The latter required a fairly high standard of financial record-keeping; the result is that fewer (only nine) farmers could eventually be subjected to financial analyses; the records of others were either not complete enough, or they were unwilling to provide the necessary data.

3. Grazing principles and management

In extensive livestock ranching, the farmer is in fact reaping sunlight and moisture which are harvested as forage, then reaped by grazing animals and eventually marketed as livestock or livestock products. It involves the management of the top half millimetre of soil and control of time (Parsons, 1987).

Various systems, or rather processes, have over time been proposed for this management. This includes various camping systems, including the procedure of holistic resource management proposed by Savory (1988). Proper grazing management involves cycles of utilization, energy flow and progressive plant succession.

The undesirable results obtained by continuous grazing are numerous and well documented (Drought Commission Report, 1923; Hall, 1934; Acocks, 1966; Voisin, 1961; Tainton, 1981; Fourie, 1983; Parsons, 1986; Savory, 1988). Its failure is best summarised by the following comment: *"In continuous grazing we are probably working with a productivity equal to approximately one third of that obtained with well managed rational (rotational) grazing"* (Voisin, 1961).

The choice between selective and non-selective grazing appears to be as important as the factor of continuous and non-continuous gazing. Quite a number of experts have warned against the effect of selective grazing (Booysens, 1969; Hall, 1934; Acocks, 1975) which removes the most palatable plants from the range. It has been pointed out that a rapid rotation between grazing periods - eg. a grazing period of one to two weeks, and subsequent resting of 5 to 14 weeks, as is often advocated - is too close to continual grazing for a brittle environment, and leads to selective grazing and plant retrogression. (Acocks, 1986; Tainton, 1981).

The duration of grazing and rest periods should be based on the need for grass to rest and regrow. Growth reserves and seed supplies have to be replenished (Hill, 1978). Stocking rate and the grazing rotational cycle ought to be adjusted to general growth conditions - therefore rainfall - in the particular year (Mc Dowell, 1972; Louw, 1975). This involves destocking in dry years and increased stocking in favourable years, thereby implying flexibility in production systems. In areas with highly variable rainfall, flexible systems based on the marketing of mature beef animals outperform less flexible systems - such as weaner calf or young steer production - ecologically and economically (Louw *et al*, 1979). The rainfall in areas with a low average precipitation is more erratic than in areas with higher average annual precipitation (Fabricius, 1964).

The problem of managing grazing and rest periods combined with stocking rates is complicated thereby that a further in some environments, continuous understocking also reduces grazing value. Undergrazing may cause dominance of higher succession, less useful plant regimes; brush (bush) invades areas under total rest (Jacks & Whyte, 1944; Davies, 1968). Thus, both over- and undergrazing are to be avoided. The latter also implies underutilization of resources and hence, irrational production.

Acocks (1966) used the parameter *"number of sheep per inch of average annual rainfall per morgen"* to adjust stock numbers. In the late 1960's and early 1970's Hobson developed the formula stock days per hectare (SDH) 100mm of rain in order to fluctuate stock numbers according to rainfall. Garnett (1988) developed the SDH/100mm up to its present form. At the present moment this may be the most useful formula available to a livestock farmer to come to grips with grazing management. It is important to plan grazing for the next 5 to 6 months (the dry period) at the end of the rainy season. This will culminate into varying stocking rates through the year and should be integrated with the rancher's marketing management.

The ability to rotate grazing depends on camping arrangements. South African pasture advisors have for long generally advocated five camp systems, but higher numbers have also been advocated (Acocks, 1968; Howell, 1968; Savory, 1988). Booysens *et al* (1974) and Kruger (1989) could not find any marginal production increases beyond eight camps per herd. The total number of camps is the product of number of herds and camps per herd. Veterenarians and animal scientists have often advocated large numbers of herds, espescially for purposes involving breeding objectives. This would involve either fewer camps per herd, or more (and smaller) camps or both. A result has been that on some farms in Namibia, investment in fencing exceeds the market value of the farm (Sartorius von Bach & Groenewald, 1991). In most cases, the addition of more camps to a four camp per herd system involves a higher marginal cost than marginal value product (Sartorius von Bach & Groenewald, 1991). It will be shown later in this paper that fewer herds and larger camps may yield superior economic returns.

4. Breeding principles and management

4.1 Breeding objectives

Much controversy exists regarding the contribution of breeding to improved livestock production in South African brittle environments. While Barton (1984), for example, is convinced that it has made significant contributions, Paterson (1990) states that there is no evidence that it has contributed to efficiency of beef production in this century. Cartwright (1982) is of the opinion that constraints imposed by seasonality in natural grazing limit the ability of breeding to contribute to improved efficiency.

The logical starting point in breeding is the choice of objectives. Major conflicts have arisen in this respect. Two general categories of objectives have been defined among geneticists alone. The first category is a 'genetic' (biological) objective (Lasater, 1972; Van Niekerk, 1972; Vorster, 1975; Cartwright, 1980; Harwin, 1981; Pearson, 1983; Rae, 1984). The second category is defined as an "economic" objective (James, 1982; Pearson, 1983; Ponzoni & Newman, 1989; Paterson, 1990). Some degree of overlapping exists between the two categories.

The first step after deciding on objectives, is choice of appropriate traits for breeding. The next step is the choice of a clear set of criteria that will objectively evaluate achievement of the objective (Rae, 1984).

As an alternative approach, the production goal of the entire enterprise may first be specified, based upon economic trends and future market requirements, and traits selected accordingly. Of the farmers in the survey, ten had pure biological breeding objectives (eg. weaning mass, age at first calving) and the other had economic or economic/biological objectives, such as Rand/ha, R/livestock unit or kg/animal.

The number of traits to be included in a selection program must be limited to the minimum. The progress in selection for any one trait is only about $1/\sqrt{n}$ (n = number of traits) times the effectivity that would be obtained if selection was applied for that trait alone (Lasater, 1972; Lasley, 1978; Stubbs 1978; Dalton, 1981). Each trait must be weighed in the light of:

(i) its economic importance;
(ii) its hereditability;
(iii) its correlation with other traits (phenotype and genetic); and
(iv) its repeatability.

Dolling's (1970) three prerequisites for a trait to be included in a selection programme are:

- its cash value;
- it's biological value, or
- it's marketing value; at times a trait can qualify on more grounds than one.

An analysis was made of traits which (Menissier, 1982; Harwin, 1981; Cartwright, 1982; Lasater 1972; Berg, 1984; Seifert, 1984; Stubbs, 1978; Meyn, 1984) should be included in the breeding of beef animals. Twenty traits were mentioned, with each author mentioning between four and nine; only two were mentioned by all nine: fertility and growth rate. Carcass quality was the only other trait mentioned by the majority. Willham (1973), Stubbs (1978), Dalton (1981), and Venter (1983) stressed the necessity of attaching priorities to traits in breeding programmes. They all placed fertility as top priority, growth second and carcass quality third. Incorrect trait priority may be a major contributory cause of poor results with breeding programs.

4.2 Fertility

High annual calf crop is the single most important trait determining profit and degree of selection practised in the beef herd (Harwin, 1966; Dearbon, 1972; Willham, 1973; Deese & Koger, 1973; Matsoukas & Fairchild, 1974; Norton, 1978; Dalton, 1981; Venter, 1982; Paterson, 1988). Estimates of the national average fertility in South African beef herds vary between 37% and 60% (Warwick, 1973; Paterson, 1988; Bosman & Hunlun, 1984). According to Warwick (1973), better managed beef herds in RSA obtain calf crops between 77% and 92%.

Although fertility as such appears to have a low hereditability (Brown *et al*, 1984; Dearborn, 1972; Lasley, 1978; Norton, 1978; Preston & Wills, 1979; Harwin, 1981; Paterson, 1988), some important traits affecting fertility, especially in bulls, are highly heritable (Deese & Koger, 1973; Bonsma, 1980; Venter, 1982). Selection for fertility is essential for profitable ranching.

4.3 Growth

Selection for growth has also been a controversial subject. A probable reason is the high genotype X environment and genotype X feeding interactions as reported by a variety of authors (Dickerson, 1984; Long *et al*, 1979; Bonsma, 1980; Frisch, 1981; Henningson, 1986; Rahnefield *et al*, 1988; Frisch & Vercoe, 1977).

It has been concluded that improved genotypes would require improved feeding - thus natural grazing - as prerequisite for better performance (Fraser, 1960; Hamburger & Ramsay, 1984; De Lange, 1985).

It can be concluded that in the foreseeable future, selection for growth does not warrant serious attention among extensive cattle ranchers. The emphasis should be on feeding, ie grazing management.

5. Marketing management

Analyses of beef prices have revealed a high degree of predictability, given the existence of seasonal and cyclical movements (Lubbe, 1989, 1990). Market planning and integration of grazing management therewith can affect revenues considerably. The rancher can in this manner influence the quantities and quality of animals marketed according to expected prices. Control of access to controlled markets has complicated this facet of beef ranch management. More stable marketers have found it easier to gain access, and this factor should be considered in ranchers' strategies. It is interesting in this sense to compare the survey farmers' marketing behaviour with that of a larger, more comprehensive and representative sample of beef ranchers as analysed by Elliott (1986). The first factor to receive attention is the relative importance of different markets. These data appear in Table 1. One can possibly see from Table 1 and some other data why these farmers were perceived to be above average managers: They achieved larger access to controlled markets and were able to sell a high percentage as breeding stock.

In this survey 77,7% of the producers were planned marketers. This could possibly explain why on average 85% of marketing permit applications were successful as opposed to the 48.5% found by Elliott. A further possible explanation could be related to size. Elliot (1986) found that the permit system favoured larger farmers and feedlotters. The average farm size in the survey was 5 782 ha as opposed to 2 844 ha in Elliott's study.

6. Management system analysis

6.1 General

The rancher's grazing, breeding and marketing management strategies are all part of a wider system- his management system. This system acts within a set of constraints and limitations. The respondents in this study ranked their limitations in the following order:

1) Climate
2) Marketing
3) Capital and knowledge
4) Marketing permits
5) Information
6) Land and labour

The remainder of this section will be devoted to a comparison of those farmers who would submitted sufficient financial data for meaningful analysis. The respondents were classified according to their IAI - ROAM (returns on assetts managed after deduction of all interest payments). The sample was divided into three groups: the top, middle and bottom thirds. Results appear in Table 2. The three groups did not differ from each other in three respects: Percentage of farm hired, average assets per animal unit and assets per hectare. The middle group had received over double the other amount of subsidies than the two groups. Some of the differences will be dealt with in sequence.

6.2 General financial data

As could be expected, the top third farmers were best off, and the bottom third worst off in all these criteria, even though the bottom third probably still does better than the average farmer in terms of solvency. The negative ROAM and net income of the bottom group are however cause for concern. This may be indicative of a gradual erosion of solvency. The results also show that returns of over 12 per cent can be achieved in cattle ranching, given good management.

It is particulary interesting that in terms of gross income per hectare, the top third outperformed the other two groups, who did not differ materially from one another. There were no real differences in expenditure per hectare between the top and the middle group; the average expenditure per hectare of the bottom group was approximately 78% higher than those of the other two groups. It appears that the top group practiced superior production and/or marketing management while the bottom group spent too much money. There are probably serious deficiencies in their financial management.

6.3 Farm size

The top third operated on average the largest farms and the bottom third the smallest. This may superficially give the impression of returns to size. However, an analysis of international research results both in agriculture and secondary industry has revealed that once one relaxes the rather tight set of assumptions under which the theory of returns to size is predicated in neo-classical theory, it becomes evident that size does not influence returns *per se*; it is a function of quality of management. Thus, under top quality management, a firm expands relative to others in the same business (Groenewald, 1991). This notion has been empirically substantiated in analyses of size and results in South African farming (Callow *et al*, 1991; Jansen *et al*, 1972). A more plausible explanation is that it has been superior management over a long period that has caused the top third to have the largest farms.

6.4 Production management

The calculation of percentage farm occupied by the breeding herd was done by determining the percentages of total herd consisting of breeding animals, the calf crop (younger than one year) and heifers/young bulls retained for herd replacement. A low percentage indicates a relatively large proportion cattle grazing until they are ready to be marketed as mature beef stock. It appears that in the case of the top third, only 38% of the farm is occupied by the breeding herd, as opposed to 100% in the case of the bottom third. The top third therefore has the most flexible system in terms of potential adaptability to adverse weather and grazing conditions, and the bottom third the lowest flexibility. These results confirm those of Louw *et al* (1979) that flexible systems yield superior results in unstable environments.

The 1984/85 and 1985/86 production years were characterised by relatively favourable rainfall, and the stocking rates may tend to indicate that the top and middle groups were able to respond by increasing their herds.

Table 1: Percentages of cattle marketed in different markets: Present sample and Elliotts' representative sample

Market destination	Present sample	Elliott (1986)
Controlled markets	53	41
Local markets	29	32
Private	3	23
Breeding stock	15	4

Table 2: Comparison of farmers according to IAI - roam ranking

Farmer's Groups Parameters	Top third	Middle third	Bottom third	Average
IAI ROAM (%)	12,8	8,3	(11,4)	7,1
Farm size (ha)	9300	4403	3600	5768
Per cent of farm hired (%)	21,3	26	16	22
Per cent occupied by breeding heard (%)	38	59	100	56
Tot Sales (T/O) per ha (R)	33,36	23,63	22,12	28,55
Gross Inc/ha (R/ha)	36,10	25,27	23,61	30,74
Tot Exp/ha (R/ha)	15,26	15,12	27,05	18,62
Net Inc/ha (R/ha)	20,84	10,15	(3,44)	12,12
Debt: Equity ratio	1:21	1:12	1:5	1:11
Debt as Percentage of equity (%)	4,7	8,6	19,3	8,7
Debt per hectare (R/ha)	9,85	19,28	40,77	18,68
Percent interest of tot expenditure (%)	4,6	15,5	26,0	13,1
Ave asset base per AU (R)	484	631	524	529
Ave asset base per ha (R)	72	98	65	77
No camps per farm	32	43	54	43
Ave size per camp (ha)	291	102	67	133
Stocking rate ha/AU	6,68	6,72	8,06	6,94
Ave subsidy per AU (R)	2,33	8,21	3,05	4,18
Percentage farmers practicing:				
National Performance testing	0	100	100	67
Crossbreeding	100	0	0	33
Multi sire mating	100	33	0	44
Pregnancy testing	67	100	100	89
Artificial insemination	0	100	67	44

The top third, having the largest farms, also has the smallest number of, and the largest camps. This probably also implies fewer and larger herds. In its turn, the larger herds force farmers to apply multi sire mating. Multi sire mating has some distinct advantages in commercial herds. When multi sire mating is practiced, a lower fertility in a particular bull or aversion of a cow to a particular bull does not have serious consequences. The void tends to be filled by another bull. Multi sire mating also tends to promote some competition among bulls. It is also remarkable that none of the top third were registered stud breeders and that they all practiced crossbreeding. None of the other did so.

Fewer and larger camps, with fewer herds yielded superior economic returns. This confirms the findings of Mentis (1991) and Sartorius Von Bach and Groenewald (1991), that economic returns to land subdivision are frequently negative. It negates the accepted belief that subdivision and the subsidising thereof by the state contributes positively to profits. Whereas the theory of land subdivision would appear to be ecologically sound, the economics proves to be more intricate. The negative returns could possibly be ascribed to one or more of the following reasons; a) incorrect critical success factor identification; b) incorrect asset based addition (fences don't yield returns); c) a lack of a resultant increase in livestock production, d) inferior management, specifically grazing management, partially due to state aid especially in difficult years; e) an unholistic approach to beef production.

The national performance testing scheme has as its main purpose the improvement of breeding for purposes of faster carcass growth. The testing is performed under conditions similar to those in feedlots. The high genotype/environment interactions referred to earlier (section 4.3) casts serious doubt on the transferability and applicability of results obtained under such conditions to extensive ranching environments. It is rather interesting that in this small sample, none of the top third of respondents participated in national performance testing, while all the others did.

None of the top third practiced artificial insemination, which was practiced by the majority of the other respondents. It requires very good stockmanship to be successful with AI under extensive ranch conditions. The results obtained casts doubt on its desirability under such conditions.

7. Conclusion

In extensive ranching conditions, managerial and financial success depends on the ability of farmers to adjust to variable natural and economic conditions. Wiltbank (1986) summarised the situation as follows:

"We have developed biological facts but in many cases have not shown their economic consequences. We have developed principles but have not shown how or under what conditions they are useful to the cattleman. In many cases, we do not understand and are not interested

in his problems. We live in a world of laboratories and classrooms isolated from the cattleman's world. Changes must occur in the beef cattle industry to meet the needs of changing populations, changing land resources and changing economic conditions". This comment embodies the key to the of missing link between literature (research information) available in agriculture and weak economic performance.

Goal setting is a prerequisite for successful management. Goals should be specified in terms of ultimate results. This will involve long-run and short-run economic returns; the former automatically implies conservation of the ecological environment.

Experience has shown that successful companies develop a corporate direction, not a strategy. They keep their basic strategy simple, self-evident and straight forward. Tightly structured strategies eliminate opportunity. (Waterman, 1988).

Adjustment to natural and economic variability involves the kind of flexibility which will enable the manager to cope with adverse conditions and to exploit opportunity. The reasoning in this article and results obtained tend to underline the importance in cattle ranching to concentrate on grazing and marketing management and also to be parsiminous in terms of fixed investment (eg in fencing) and cost-increasing technology. Production, marketing and financial management are three indispensable and simultaneously undivorceable facets of profitability and sustainability.

Note

1. The article is based on an MSc(Agric) thesis by Isaac Jocum at the University of Pretoria. He is presently Managing Director of M Jocum & Sons.

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