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ACTION EGG PRODUCTION

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"The great end of life is not knowledge but action" wrote British Philosopher Thomas Huxley. There may not be a better summation of the egg industry which has strength in the former and excels in the latter. Within the span of a quarter of a century egg production has been transformed from a home industry into an efficient, capital and technology intensive, segment of agribusiness.

Major changes have occurred in the structure and operation of the egg industry over this time span. As sizes of units have increased a concomitant decrease in number of farms has occurred. This has resulted in uniformity of quality and output. Moreover the adoption of existing knowledge and the acceptance of new technology has resulted in the declining real cost and consumer prices of eggs. The structural change in the industry to larger units will continue in the future as investment capital and expertise becomes increasingly important inputs. Paradoxically the development of an egg industry in the Black States and Homelands may have to be chartered towards small decentralised production units.

Although self-sufficiency in food may be the prime objective of an agricultural policy the cost of exporting surplus eggs has largely been borne by the consumer and in the recent past surplus product has severely affected producer profitability. When the supply of eggs unnecessarily exceeds demand price increases are indefensible irrespective of escalating production costs and will result in severe price pressure in the market. However the speed of adaption to price vectors is remarkable compared to other agricultural sectors. Furthermore the sensitised consumer will react vehemently to subsidising inefficiency within the industry or export losses on feedstuffs.

The egg industry is a major consumer of maize. The laying hen has the ability to efficiently use grain to convert waste to increase the overall supply of human food (McClymont, 1976). By-products and offals of many industries such as wheat and maize milling, starch extraction, sorghum beer production, fish processing, abattoir rendering and edible oils which would otherwise present major disposal and pollution problems are used in poultry diets (Mordant, 1981).

The projected growth of the population in Southern Africa and the increased standard of living it will no doubt enjoy could result in a substantial increased requirement for eggs. Problems which will concern the egg industry in the future are

- maintaining cost competitiveness with other protein foods
- sustaining rates of gain in new technology to maintain competitive edge over other food products
- training of manpower
- access to investment capital
- developing and funding a generic advertising programme
- developing a strategy for a viable industry in the Black States and Homelands, and
- transferring the bridle of bureaucratic control to free enterprise.

The purpose of this paper is to examine and evaluate the options available and the actions necessary in structuring a viable and dynamic egg industry for the future.

Structural Evolution

Earlier, chickens and other poultry were kept on most farms. Output of eggs and meat were used to supply family needs and furnish pin money for the housewife. Country assembly channels collected the eggs for further processing and distribution in urban areas. Wide seasonal fluctuation in supply and prices occurred. Food consisted of self-fended scraps with some kitchen leftovers and scratch grain provided. Small hatcheries supplemented the broody hen and supplied chicks to local producers. Buildings and equipment, if provided, were home built and diseases were treated with made or purchased remedies (Viljoen, 1979). In many black areas the small backyard flock supplying food to the family still exists.

Gradually specialised egg production units developed with poultry meat derived from culls and cockerels a by-product. The efforts of the Department of Agriculture in supplying literature and publications, conducting short courses and lectures and providing extension work made a valid contribution to the well-being of the many egg producers. Through the years the South African Poultry Association played a major role in the affairs of the industry (Oosthuizen, 1982).

During the 1950's development of egg production on the precincts of the urban areas commenced. Favoured by climate, the use of manure in orchards and vineyards, innovative farmers with available capital, the laying cage catalyzed modern egg production in the Western Cape. This method of husbandry transformed egg production in South Africa from a home industry to the capital and technology intensive industry of today, and resulted in the demise of the platteland producer. These structural changes were evolving as a result of the application of available technology, economy of scale which exists, purchasing power and market demands (Rodgers, 1980). These changes resulted in regular supplies of high quality eggs to the benefit of the consumer. The cyclic production pattern of the non-industry flock still influences seasonal demand.

As flock sizes increased a concomitant decrease in producer numbers occurred. For a considerable time the old and modern industry existed in parallel. Pricing policies designed to protect the small producer could not keep the one sector viable and stimulated production in the other. Control measures such as seasonal prices, differential floor prices and lower margins to producer packers attempted to stem the tidal wave of natural evolution and culminated in control of production.

Fundamentally the object of the Egg Production Control Act (Act No. 61 of 1970) was to protect the producer from the threatening injudicious investment of capital by outside interests, in the egg industry. As with many decisions aimed at short term results the application of this measure accelerated the structural changes (Table 1) and increased production of surplus eggs (Treurnicht, 1977). By creating an economic climate suited to vertical integration production control resulted in the balanced feed industry steeped by years of operation in other controlled sectors investing in captive business.

The existence and application of existing technology was a precondition to the structural changes which occurred. Advances in genetics, nutrition, disease control, physiology, husbandry, business management, shortening marketing channels and food merchandising were applied. Many producers did not adapt rapidly and could not survive. An integrated egg operation can involve all or most of feed supply, parent flocks, hatchery, replacement rearing, production units, processing plants and distribution. In contrast to other agricultural products marketing channels are short and a major part of production is delivered directly to the retailer by the egg producer. Increases in efficiency have negated the rapid increases in feed and other inputs and resulted in the maintenance of real cost and consumer price of eggs.

Attempts to develop an egg industry in the Black States and Homelands have been unco-ordinated, lacking in global planning and is currently used to obtain a subsidised source of capital and mainly aimed at circumventing production control regulations.

Table 1

Structural changes in farms, layer flocks and production 1968–1981

Flock size	Percentage of total farms		Percentage of total layers		Percentage of total production	
	1968	1981	1968	1981	1968	1981
0 – 9999	92,5	60,7	41,3	8,4	38,6	7,2
10000 – 29999	6,0	25,0	31,3	17,7	33,0	17,0
30000 – 49999	0,7	5,9	7,5	11,7	8,1	12,2
> 50000	0,8	8,4	19,9	62,2	20,3	63,6
Independent			100,0	55,7		
Feed interests			–	44,3		

Source: Calculated from data supplied by the Egg Control Board, 1982.

Table 2

Projected aggregate population of Southern Africa 1980–2005 (000's)

Group	1980	1985	1990	1995	2000	2005
White	4685	5156	5641	6135	6641	7162
Coloured	2721	3135	3613	4138	4699	5298
Asian	829	935	1045	1156	1270	1384
Blacks	20365	23399	26776	30553	34747	39294
	28600	32625	37075	41982	47357	53138

Source: Department of Statistics, 1980

Demand and Production Parameters

Population

From the population aggregates of Southern Africa and the projected growth until the year 2005 (Table 2) it is evident that over the 25 year period growth of the total population will be about 85% and the population increase of blacks will be at a higher rate than other groups. Rapid urbanisation of the black population will take place during this time span with increased standards of living and changing eating habits developing.

Consumption

Total per capita egg consumption in South Africa is low at present (Griessel, 1979). The egg consumption of urban population groups (Table 3) illustrates the vast available potential for increased sales. The figure for whites is in accordance with egg consumption in western countries and it must be assumed that consumption will decline or at best remain static and only population growth will increase demand. Conversely as the coloured, asian and black groups of the population become urbanised and enjoy higher standards of living and relative price of other foods increase, eating patterns will change. Eggs will be an important component of the protein intake of these peoples. No long term trends are available to accurately calculate future demand growth and the projections of Griessel (1979) estimating a per capita consumption of 114,3 eggs by the year 2000 could be conservative. This is illustrated by the calculation that should the above factors interact to achieve egg consumption for the total population in the year 2000 equal to that of urban population groups in 1980 a *per capita* consumption figure of 162,8 will be reached.

Demand

The product of population growth and projected egg consumption patterns result in significant increases in egg requirements. These increases will not be linear as in the past factors such as the state of the economy, price of competitive foods, health scares and food marketing by supermarkets could influence consumption trends in the short term.

Table 4 is an indication of the likely range of egg requirements in the year 2000 and illustrates the large potential growth available to the egg industry. In general terms egg consumption has doubled over each of the last 3 decades.

Table 3

Shell egg consumption of urban population groups – 1980

Group	Shell egg consumption per annum
White	246
Coloured	183
Asian	170
Black	144

Source: Egg Control Board, 1982

Table 4

Projected demand for eggs in the year 2000[1]

per capita consumption	annual production cases x 10^6
114,3[2)]	15,1
162,8[3)]	21,5
100,0[4)]	13,2
175,0[4)]	23,1
132,5[5)]	17,5

1) Based on population of 47,5 million
2) Griessel (1979)
3) Based on 1980 urban consumption
4) Likely range. 5) Practical estimate

Production

A major increase in production per layer was recorded in the recent past due to industry changeover to imported stock. Gains in genetics (Warren, 1978) and management will continue to result in increases in output although at a slower rate. Changes in cost elements of egg production will result in hen-day egg production remaining static due to increase in flock age. The size of national flock to produce 17,5 million cases of eggs and magnitude of ancilliary operations is summarised in Table 5.

Table 5

Size of layer flock to produce 17,5 million cases per annum

Layers	24 000 000[1)]
Layer replacements	25 000 000
Dayold pullets	26 000 000
Parents	400 000
Grandparents	10 000

[1)]Based on 72,5% henday production

A further spin-off occurs from the egg industry in the form of dayold males and spent hens.

Feed

Feed is the most important cost input of the egg industry and the price of eggs is extremely vulnerable to decreases in supplies and increases in price. The feed requirements for the period under review and, of more importance, the essential nutrients needed based on typical 1982 nutritional requirements for layers are projected and summarised in Table 6.

Capital requirements

The egg industry is capital intensive and as the labour component of production cost increases and as new technology becomes available, capital requirements will increase. Assuming that all production facilities will have reached the end of their economic life by the year 2000 and will have to be replaced, the capital investment required during the period under review is presented in Table 7.

Table 6

Feed and Nutrient requirements of egg industry – 2000

Type	Layer	Layer Replacement	Parent	Total (tons)
Consumption (kg/yr)	40,8	8,0	50,0	–
Total (t/yr)	980000	200000	20000	1200000
Nutrients (t/yr)				
Protein	161700	34260	3300	199260
Lysine	6860	1612	140	8612
Methionine	3038	692	62	3792
Tryptophane	1568	354	32	1954

Table 7

Capital investment requirements 1982–2000 (based on 1982 values)

Type	Factor	Expenditure 10^6
Grandparents	R150/unit capacity	R 1,5
Hatching eggs	20/parent capacity	8,0
Hatcheries	4/per egg capacity	10,0
Layer replacements	5/pullet per annum	125,0
Layers	12/layer capacity	288,0
Processing and distribution	5/case per annum	87,5
TOTAL		R520,0

Prospective newcomers irrespective of size will find it difficult to compete with operations in the industry based on efficient depreciated facilities.

Action

Various options exist and actions are required to solve the problems which will concern the egg industry during the period under review. The correct decisions will structure a viable and dynamic future industry.

Maintaining cost competitiveness with other protein foods

Currently eggs can be considered a good buy. The maintenance of the relative price compared to other protein food is fundamental to a viable future industry. The elements involved are:

– *breeding and genetics*

The availability of superior genetic stock with production characteristics required by the industry is fundamental to efficient egg production. In 1953 an embargo was instituted prohibiting the private importation of poultry. In 1965 the Department imported 182 dozen hatching eggs of three different lines of White Leghorns for distribution to local breeders. For many years this isolation was motivated by breeders on a veterinary basis and in retrospect the cause was one of self-protection. The changing industry requiring stock which was not available locally resulted in the era of smuggling. A Commission of Inquiry (Anonymous 1976) recommended that importation be allowed under specific conditions and this resulted in international commercial generation stock becoming available to the industry in 1978. The change to imported lines of layers was rapid. The industry has recently motivated a case for meaningful change to the regulations under the Livestock Improvement Act 1977 (Act 25 of 1977) for the importation of poultry. State quarantine facilities at Irene are inadequate to service the needs of industry and a policy to allow on-farm quarantine should be adopted.

Random sample egg production tests have been conducted at Glen and Irene since 1963 and 1970 respectively. Initially these tests caused the demise of many breeders while others sold their wares on results achieved. The tests also comply with the provisions of the Livestock Improvement Act and breeding material must be evaluated on the tests before importation permission is granted.

The current value of the tests to the egg industry is questionable as the average management priorities employed benefits some birds and is prejudicial to others. This problem is inherent to all egg random sample tests. On the other hand it is doubtful whether a low enough threshold could be established practically to disallow importation. The current effort should be focused on one test employing the latest production techniques to be of any value.

Rate of overall genetic gain will continue but the investment required to maintain this progress will increase exponentially. However, the cost of genetic research is insignificant to the end user. Modern poultry breeding is based on substantial and carefully selected nucleus strain populations linked to highly structured multiplication stages. Only a handful of internationally operating breeding companies can maintain an adequate scale to invest in capital, manpower and technology required to remain competitive.

– *reconciliation of environment, animal welfare and energy conservation*

The production of eggs and the ancilliary functions are not agrarian operations in the true sense but secondary

industry conducted on farm land. Generally the populace with animal protein palates decry intensive animal production due to the effect on environment and/or animal welfare.

environment

There can be no doubt that densely placed structures on the precincts of urban areas distract from the natural beauty of the environment. Intensive egg production can pollute water sources, can cause nuisances with odours, feathers and noise and result in extensive fly breeding. Many producers have not recognised the importance of harmonising production with the environment. Several authorities such as the Division of Environmental Planning of the Department of the Prime Minister, the Department of Health and the Water Research Commission have jurisdiction on intensive livestock production. It behoves the poultry industry which is at the cutting edge of pressure and in the past has only counteracted this pressure to formulate an overall strategy in this regard together with other livestock industries.

animal welfare

The management changes introduced by modern egg production practices have prompted questions in the area of animal welfare and stress. Public support in European countries has led to legislatively enforced safeguards for the welfare of animals. The moral principle involved of existing production practices relies on a higher priority for human food than animal welfare. Under these conditions the search for technology that will minimise stress and discomfort and at the same time maximise production must receive top priority. The interests of other intensive animal production sectors must be co-ordinated.

energy

Transport fuel is a significant element of production cost. The implication is that production will take place in the proximity of urban areas causing environmental problems. In addition the industry uses energy for heating, lighting and power. Much basic knowledge is available on the principles of energy conservation. The application of these principles to minimise energy consumption in one or more of the following areas will require increased attention

- heat exchangers in hatcheries and processing plants
- solar heating in brooding, hatcheries and processing plants
- insulation of roofs and sidewalls of poultry buildings
- reducing lighting stimulus and intermittent lighting
- evaporate cooling, and
- benefits of natural ventilation

As the relative cost of feed energy increases the conservation of biological energy becomes more important. Insufficient attention has been placed by the industry on the maintenance of body heat during the winter while benefitting from long mild climatic conditions during the summer.

– *feed availability and price*

Feed is the largest and most critical cost input of egg production and South Africa is indeed fortunate that it is self-sufficient in energy feedstuffs while small amounts of high quality protein feedstuffs have to be imported. Dwindling fish meal supplies have to a large extent been replaced in grower and layer rations by sunflower oilcake which provides crude protein but is deficient in lysine. The presence of chlorogenic acid which stains the egg shell limits its use as a sole source of protein for layers. Cloete (1981) and Griessel (1979) have adequately embroiled on the future protein requirements in South Africa.

The following pathways to overcome the projected protein shortage have been mooted in the past. It is essential to the egg industry that action in these fields is introduced.

- The 1981 maize crop was more than double consumption yet consumer price is at a record high and high quality protein has to be imported. The differential pricing policy between maize and oilseeds and edible oils and oilcake have encouraged energy production to the detriment of protein. Energy and protein crops have to be relatively priced on supply and the value to the consumer.

- Soya bean has a better amino acid profile than sunflower. A full programme to encourage soya bean production should be instituted. This product can be used either as full fat or extracted form.

- Oil cakes and maize (Grobbelaar, 1978) vary in quality. The production of high lysine maize for example can only be encouraged if raw materials are purchased on a protein quality basis.

- Strategic protein feeding (Gouws, 1981) would maximise the use of available essential nutrients. The feeding of pullets and layers to their requirements and seasonal feeding of layers could assist in minimising protein use.

Sustaining rates of gain in new technology

Fortunately the bulk of poultry research in overseas countries and the production technology used are applicable to South African conditions. Yet unique problems do exist which require local study and local applied research is conducted by public institutions,

universities and the private poultry and ancilliary industries. The poultry industry remains abreast with developments overseas through industry journals, scientific literature and overseas visits. In the past tours by scientists from abroad have contributed towards local knowledge and stimulated the application of technology.

In general public research has in the recent years been directed into ineffective channels. The South African Poultry Association is attempting to co-ordinate public research and motivate research budgets commensurate with the relative importance of the poultry industry in agriculture. In addition research acts as a training area for human resources and tends to develop knowledge in the problem areas of the industry.

Recently the South African Poultry Association has studied the future research priorities and the co-ordination required for meaningful future progress (Coetzee, 1982). This fuction and liaison with public research institutions should be ongoing and should the authorities act on these recommendations progress will be made.

Training of Manpower

Egg production is similar to most industrial endeavours and comprises a complex set of management decisions. The biological factor which is inherent in livestock production imposes another dimension on decision making and success. Typical units are large and exceed one man size and stockmanship plays an ever decreasing role in production. Extension work by the Department of Agriculture has been succeeded by the feed, veterinary product, stock and other service industries. As the structural change to larger units continues the application of available knowledge and new innovations will be of prime importance.

The committee of the local WPSA (Brock, 1975) undertook a survey of the manpower needs of the poultry industry. The results stressed the urgency of training in the industry but during the ensuing 7 years no action has been forthcoming.

Three categories of manpower are utilised in the industry

- *Farm supervisors*
  These have generally been self-trained. The poultry industry should initiate a strategy and co-ordinate efforts with SAAU in training this level of human resource.

- *Middle level personnel*
  The shortage of middle level management personnel with formal training was one of the elements for failure of a significant number of independent producers. The poultry industry should explore as a top priority the training of this level of manpower. Unless urgent steps are taken in this regard the independent egg producer is unable to survive.

- *Professional*
  In the past the egg industry has not been a major employer of animal science graduates. Remuneration has not been commensurate with responsibilities involved. Most of the technological inputs used have been brought to the industry via the ancilliary industries.

Access to investment capital

The egg industry is capital intensive and as labour costs increase and new technology requires additional expenditure, the relative capital required for egg production will increase. In addition many facilities are currently antiquated and as demand for eggs grows capital input will rise substantially.

As egg producers have historically been excluded from the normal medium term agricultural finance via the Landbank the balanced feed industry has traditionally been the source of capital to independent egg producers. Commercial banks are reluctant to extend credit to poultry farmers and this situation was an important factor in the rate of structural evolution as feed interests protected potential bad debts and used capital in own efforts. Recently Landbank loans have become available to egg producers to finance expansion but major problems still exist in this regard. Agricultural co-operatives which could be used by farmers have recently integrated into egg production to protect feed interests.

Capital could be sourced to some extent from within the industry from profits but as structure of industry changes to larger units outside corporate investment capital will have to be made. The inherent cyclical profit nature of the egg industry will act as a constraint on this source of investment. If it is the policy of the authorities that smaller independent producers are attracted and kept viable in the industry adequate funding via the Landbank is a prerequisite.

Developing and funding a generic advertising programme

Eggs are competing with many other generic and branded food products some backed by highly funded advertising budgets. The egg industry has for many years acknowledged the fact that to sustain growth in consymption, eggs have to be promoted. The allocation of Egg Control Board funds over the years (Table 8) reflects an unsatisfactory history in this regard. It is doubtful whether any significant benefit was achieved from these efforts. The recently launched egg promotion campaign is unimpressive although much expertise is

available overseas. The Egg Control Board apparently does not have the authority to adequately commit levy funds to advertising budgets. The programme should be directed toward maintaining consumption in white population and spearheaded toward increasing consumption in the other population groups.

A voluntary commitment of sufficient magnitude by all of egg industry is urgently required to research and fund a long-term generic advertising strategy. This mode of financing will create independence from the shackling policy of the authorities. Many sources exist such as dayold pullets, packaging, layers and eggs, on which funds could be levied. The Egg Control Board could still be used to channel funds in desired directions.

Developing a strategy for a viable industry in the Black States and Homelands

The economic viability of the Black States and Homelands especially as regards agriculture is the key to successful development in the areas (Bembridge, 1979). The initiation of poultry projects in these areas are seen as an aid to employment and satisfying demand for protein. The egg industry is capital intensive and the creation of large-units in these areas does not achieve the basic objective.

Generally poultry production projects in these areas ar are considered by the egg industry as

- the source of subsidised capital
- circumvention of production control regulations and
- the sale of overpriced stock, equipment, feed and/or expertise

The long-term objective of a strategy for a viable egg industry in the Black States and Homelands must be to create a decentralised pastoral industry in these areas. Centralised capital intensive high technology ancilliary operations such as parents, hatcheries, layer replacements, feed milling and egg processing and distribution may be required but the relatively labour intensive egg production phase should be based on small units. New innovations in production, husbandry, business management and control will be necessary to achieve success.

Transferring the bridle of bureaucratic control to free enterprise

The industry is subjected to two systems of control and it is essential that a viable future industry is based on a system of free enterprise.

– *egg control board*

The Egg Levy Advisory Board was created in 1924 to keep the Minister of Agriculture informed regarding the poultry industry and in 1942 an Egg Purchasing Scheme was established for the purpose of seasonal surplus removal. The main objective of the Egg Control Board which was incepted in 1953 in terms of the Marketing Act was to create stability in the egg industry. Seasonal production existed and demand was inelastic. Export profits soon became ever increasing losses. For a considerable time the old and modern industry existed in parallel. Economic policies designed to protect the small platteland producer stimulated the establishment of intensive production units. Through the years a floor price which was sufficiently attractive to the evolving industry stimulated the production of surplus eggs. In its attempts to stabilise the industry the Egg Controll Board has collected over R72 million in egg levey during the period 1953/54 – 1980/81.

According to the existing provisions the main activities of the Board are

- removal and processing of surplus eggs from the market

Table 8

Egg Control Board funds spent on sales promotion 1953/54 – 1980/1981

Year	Amount
1953/61	R –
1961/62	15 317
1962/63	38 483
1963/64	9 357
1964/65	125 326
1965/66	134 118
1966/67	87 533
1967/68	52 709
1968/69	74 404
1969/70	83 895
1970/71	16 021
1971/72	66 868
1972/73	102 241
1973/74	68 127
1974/75	60 131
1975/76	144 253
1976/77	114 659
1977/78	169 765
1978/79	133 609
1979/80	138 058
1980/81	516 543
TOTAL	R2 151 417

Source: Egg Control Board, 1981

- gathering and analysing statistics
- sales promotion

Today the egg industry must be seen as a secondary industry and not primary pastoral production as envisaged in the Marketing Act. The current cost of administering the egg control scheme does not warrant the potential benefits and in essence protects feed industry interests. The function of the Board in stabilising the industry is largely conducted by surplus pool agreements among producers in surplus regions at present. The activities of the Board should be drastically curtailed and should be constrained to

- collection of data and analysis of industry statistics
- operating the generic promotion strategy funded by industry

– *production control*

The evolutionary structural changes which occurred in the industry, the inability of the Egg Control Scheme to curtail surplus production and the threatening investment of large sums of outside capital culminated in production control. Initially this measure was viewed as the saviour of the industry. The protection afforded by production control accelerated the evolutionary changes. Many production units were bought for permit value while other were sold at unrealistic prices to corporate producers and feed companies although facilities were practically worthless and required rebuilding. During the period 1976 – 1978 the structure of the industry underwent revolutionary changes as the balanced feed industry invested in vertical integration.

During the first production control period factors such as

- issuing of permits irrespective of market demand
- high floor price under production control umbrella
- efficient producers could not grow while economic sick were kept alive
- constraints on newcomers
- capitalisation of permits, and
- rapid integration of feed industry

resulted in many problems, an increasing surplus production and the measure was suspended in 1977 (Alberts, 1977 and Treurnicht, 1977).

Interacting factors during this period was the rapid increase in productivity by imported laying strains and the downturn in the economy. The corporate investors soon found the industry in a loss situation. Supermarket buyers were in their element. The major producers attempted to rationalise the industry by motivating a case for the re-introduction of production control and forming a processing and distribution co-operative (NEPCO). This organisation ceased trading after a short period.

Any future mechanism employed to limit surplus egg production or control of production must take cognisance of the following factors

- the egg industry is inherently cyclical
- wide ranges in production costs exist between producers
- husbandry is a prime input of production, and
- Black States and Homelands production

The sensitised consumer will react to inefficiencies caused by control measures. The control of egg production should be seen as a short-term measure aimed at creating a stable industry and once this has been achieved it should be discontinued and the egg industry left to free economic forces.

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